INVERTER

Inverter User's Manual

ZVF9-G & ZVF9-P Series

JEENDA CONTROLS CO.,LIMITED

Foreword

Thank you very much for your purchase of ZVF9 series of inverters.

This manual introduces the installation, operation, function setting, trouble shooting and etc. of inverters.

Incorrect installation or use may result in damage or other accidents. Do read all instructions in detail before installing or operating.

Please forward this manual to the end user, and keep it handy for quick reference.

If there are any doubts or questions, please contact the Technical Service Center of Company.

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Chapter 1 Safety Instructions

1.1 Safety Symbols and Definitions

The safety instructions described in this manual are very important. To avoid any error that may result in damage to equipment, injury to personnel or loss of property, do read and clearly understand all of the safety symbols, symbol definitions and be sure to observe the indicated safety instructions below.

Safety Symbols	Symbol Definitions
	HIGH VOLTAGE: This symbol indicates hazardous HIGH VOLTAGE. Any incorrect operation may result in serious damage to the equipment or death to personnel.
	WARNING: This symbol indicates that any incorrect operation can result in damage to the equipment or minor to moderate injury to personnel.
	CAUTION: This symbol calls your attention to follow the instructions while in operation or in use.
	TIP: This symbol calls attention to some useful messages for the user.
	FORBIDDEN: This symbol indicates anything forbidden to do.
	COMPULSORY: This symbol indicates something must do.

1.2 Application Range

CAUTION

● This inverter is applicable to general industrial purpose three-phase AC asynchronic electric motor.

WARNING

●This inverter cannot be used in the equipment that may result in threat or injury to personnel due to inverter trouble or error, such as nuclear power control equipment, aviation equipment, transportation equipment, life supporting system, safety equipment, weapon system and etc. Please consult Ziri Company before using it for special purpose.
●This product is made under strict quality control and supervision. But when used in some key equipment, protective measures should be taken to avoid further extension of accident due to inverter trouble.

1.3 Installation Ambient

CAUTION

●Be sure to install the inverter in a well-ventilated indoor location. To get the best cooling effect, it is recommended to fix the inverter vertically, and extra ventilation devices are needed when installed horizontally.
●Be sure that the ambient temperature is between -10~45oC. If the temperature is higher than 45oC, please remove the upper cover. If the temperature is higher than 50oC, forced heat radiation or derating is needed from the external. It is recommended not to use the inverter in such a high temperature. Otherwise, it may greatly reduce the service life of the inverter.
●The ambient humidity is required to be lower than 90% without dew condensation.
●The inverter shall be installed in a place where the vibration is less than 0.5G. Otherwise, it may fall and cause damage to the equipment. It is also noteworthy that the inverter could not bear any sudden bump.
●The inverter should be kept away from electromagnetic interference (EMI), flammable and explosive ambient.

WARNING

●Be sure to install the inverter on metallic materials (i.e., metal). Otherwise, there is the danger of fire.
●Bu sure not to let the foreign matter enter the inverter, such as wire clippings, spatter from welding, metal shavings and etc. Otherwise, there is the danger of getting burned due to short circuit.

1.4 Cautions for Installing

HAZARD

●Do not operate electrical equipment with wet hands.
●Do not operate wiring unless the power supply is completely off.
●Do not open the front cover or perform wiring while the inverter is powered ON. Otherwise, there is the danger of electric shock.
●Do wait at least 10 minutes after the power is disconnected before performing the work of wiring or inspection. Otherwise, there is the danger of electric shock.

WARNING

●Do not install or operate if the inverter is damaged or has parts missing to prevent injury to personnel or loss of property.
●The main loop terminal should be tightly connected to the cable. Otherwise, the inverter may be damaged arising from loose connection.
●The ground terminal must be reliably and properly grounded to ensure security. To avoid common ground impedance, multi-piece inverters should be grounded at one shared point, as shown in Figure 1-1.

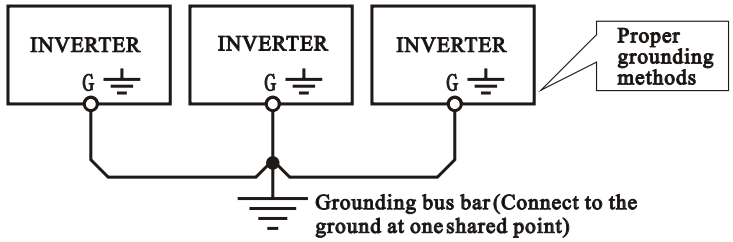


Fig. 1-1

FORBIDDEN

●DO NOT connect control terminals (except terminals marked "TA", "TB" and "TC") to AC 220V power supply, which may cause damage to the inverter.
●DO NOT connect AC power supply to the output terminals marked "U", "V" and "W". Otherwise, it may cause damage to the inverter, as shown in Figure 1-2

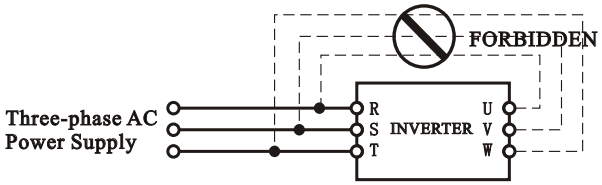


Fig. 1-2

COMPULSORY

●DO install a no-fuse circuit breaker or leakage protective circuit breaker in the side of inverter input power supply to prevent expanding of accident due to an inverter problem.

CAUTION

●It is not advisable to install an electromagnetic contactor in the side of output power supply, because the operation of open and close to the contactor when the motor is running may cause damage to the inverter arising from over-voltage produced during this process. But it is still necessary to install a contactor if one of the following three points occurs:
①The system of frequency converting governor used to control energy-saving usually works at a rated rotation speed. To run the governor economically, there is a must to remove the inverter.
②The inverter participates in some import procedure and cannot stop operating for a long period of time. To realize free shift in various control systems and improve the reliability of these systems, there is a must to install a contactor.
③When an inverter controls several motors, there is a must to install a contactor.

1.5 Cautions for Operation

HAZARD

● Do not operate electrical equipment with wet hands.
● An inverter stored for half a year or longer should be given powerup test before use so that the main circuit filter capacitor could be recovered. When the inverter is in the state of powerup, it is necessary to raise the voltage gradually to the rated value with a voltage regulator. Generally, the charging time should be controlled within 1~2 hours. Otherwise, there is the danger of electric shock or exposure.
● Do not touch the inner side of the inverter while the power is ON, nor put any foreign matter, i.e., rod or other matter inside the inverter. Otherwise, it may result in serious damage to the equipment or death to personnel.
● Do not open the front cover while the inverter is powered ON. Otherwise, there is the danger of electric shock.
● Be careful to select the Restart Mode. Otherwise, there is the danger of personnel death.

WARNING

●If the inverter runs at a frequency higher than 50Hz, DO confirm it is within the speed range acceptable by your motor bearing and mechanical device. Otherwise, there is the danger of damage to the motor.

●It is not advisory to run the reduction box, gear and other mechanism that need lubricating at low speed for a long period. Otherwise, it may reduce the service life of these equipment or even damage the equipment.

●Derating should be done before use due to less effective of heat dissipation when a general motor runs at a low frequency. If it is a constant torque load, then a forced method or a special variable frequency motor should be used to release heat.

●DO cut off the power supply of an inverter set aside for a long time to avoid foreign matter or other things enter in it which may cause damage to the inverter or even lead to fire.

●The output voltage of inverter is PWM impulse wave. DO NOT install a capacitor or surge current sink (i.e., a varistor) in the inverter output port. Otherwise, there is the danger of fault tripping of the inverter or damage to its power elements. DO remove such kind of things if already installed. See Figure 1-3 below.

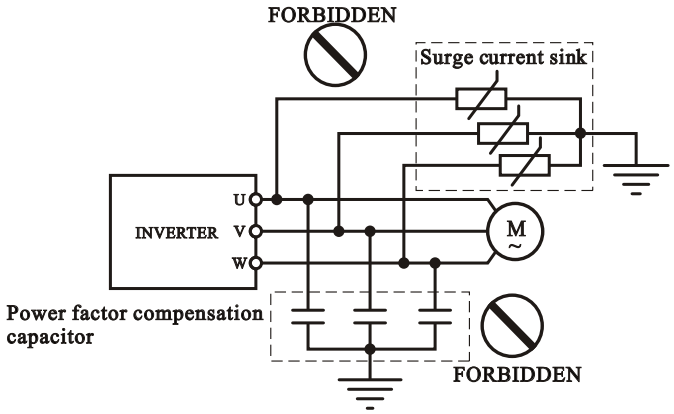


Fig. 1-3

CAUTION

●Motor insulation should be checked before the inverter is used for the first use or reused after a long-term idle. Be sure the insulation resistance measured is no lower than 5Ω

If the inverter is used beyond the range of allowable working voltage, then an extra step-up or step-down voltage transformer shall be configured.

Due to thin air in a place where the altitude is higher than 1,000m, the heat dissipation of inverter will be less effective. Hence derating should be done before use. In general, when the height rises by 1,000m, the rated voltage of the inverter shall reduce by 10%. Refer to Figure 1-4 for details of the derating curve.

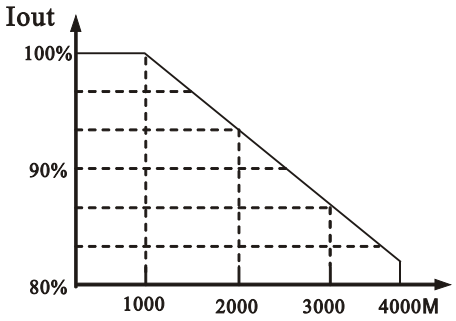


Fig. 1-4 Diagram of Inverter Derating Curve

FORBIDDEN

●DO NOT touch the radiator or charging resistor of the inverter with hand(s). Otherwise, there is the possibility of getting scalded.

●DO NOT proceed direct start-stop operation frequently with a contactor or any other switch devices in the inverter input side. As large charging current exists in the main circuit of the inverter, frequent power-on/off may produce cumulative effect resulting in heat fatigue of inverter components and great reduction of service life of the inverter. See the detail in Figure 1-5.

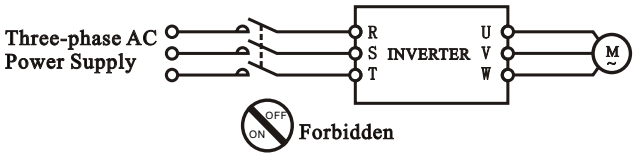


Fig. 1-5

COMPULSORY

●In case abnormalities occur, such as smoke, off odor, strange sound, DO cut off the power supply immediately, overhaul the equipment or turn to the agent for help via phone call.

1.6 Cautions for Disposing

WARNING

●Exposure may happen when the electrolytic capacitor (ELCC) of the inverter burns. Be careful to cope with it.
●The plastic parts on the operator panel will give off toxic gas when getting burned. Be careful to cope with it.

CAUTION

● Dispose damaged inverter as industrial waste.

Chapter II. Introduction to the Product

2.1 Unpacking and Inspection upon Arrival

This product is guaranteed a high level of quality with strict outgoing inspection, crushproof and shockproof packaging. But this does not preclude damage to the product due to heavy collision or strong extrusion. So it is necessary to unpack the inverter upon arrival and perform these steps:

①Check whether there is a deformed or damaged casing; or any shattered component.

②Check the specifications label of the inverter and make sure it matches the product part number you've ordered.

③Check whether the items in the packing list are in readiness or not.

If there is any problem with the above-mentioned contents, please contact the supplier or Ziri Company immediately.

2.2 Diagram of the Model

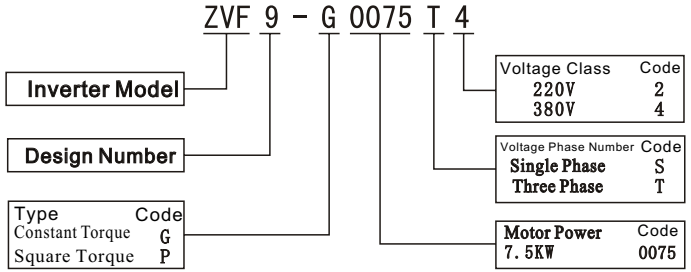


Fig. 2-1 Inverter Model Diagram

2.3 Specifications Label

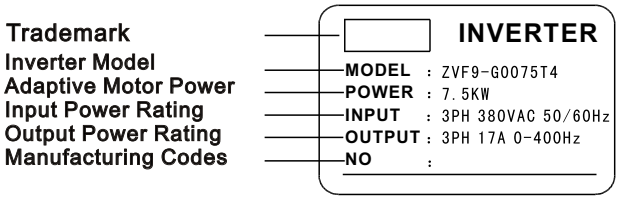


Fig. 2-2 Specifications Label

2.4 Outside Drawing & Structure

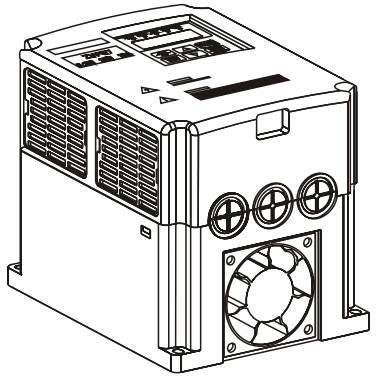
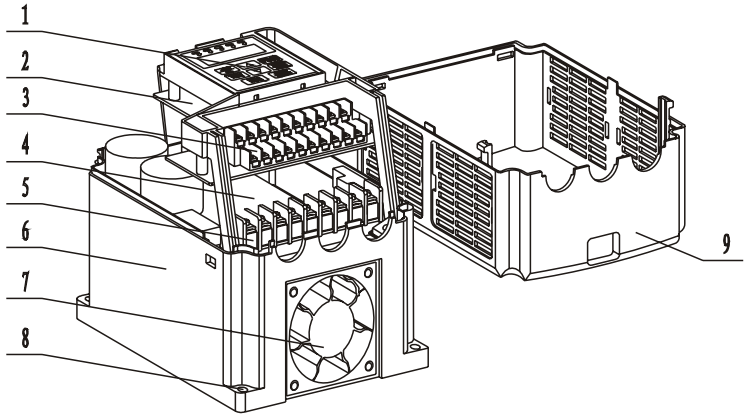


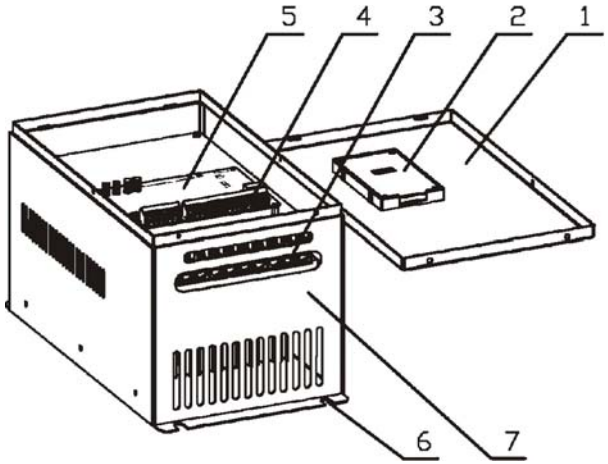
Fig. 2-3 Model A Outside Drawing



1. Operator Panel 2.Control Panel 3. External Control Terminal 4. Main Circuit Board 5.Power Terminal 6. Casing 7.Fan 8.Installation Hole Site 9.Upper Cover

Fig. 2-4 Model A Structural Representation

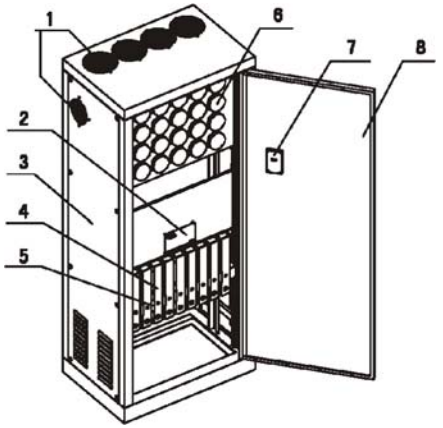
Fig. 2-5 Model B Outside Drawing



1.Upper Cover 2. Operator Panel 3. Power Terminal 4. External Control Terminal 5. Control Panel 6. Installation Hole Site 7. Casing

Fig. 2-6 Model B Structural Representation

Fig. 2-7 Model C Outside Drawing



1.Fan 2. Control Panel 3.Cabnet Body 4. Wiring Copper Bar 5.Power Terminal 6. Electrolytic Capacitor (ELCC) 7. Operator Panel 8. Cabinet Door

Fig. 2-8 Model C Structural Representation

2.5 Models and Specifications

Table 2-1 Inverter Models

Inverter Models (G: Constant Torque Load) (P: Fan or Pump Load)	Input Voltage (V)	Rated Output Current (A)	Adaptive Motor Power (KW)
ZVF9-G0007T2/S2	220	4.0	0.75
ZVF9-G0015T2/S2	220	7.5	1.5
ZVF9-G0022T2/S2	220	10.0	2.2
ZVF9-G0037T2/S2	220	16.5	3.7
ZVF9-G0055T2	220	25	5.5
ZVF9-G0075T2	220	33	7.5
ZVF9-G0110T2	220	49	11
ZVF9-G0150T2	220	65	15
ZVF9-G0185T2	220	75	18.5
ZVF9-G0220T2	220	90	22
ZVF9-G0007T4	380	2.3	0.75
ZVF9-G0015T4/P0015T4	380	3.7	1.5
ZVF9-G0022T4/P0022T4	380	5.0	2.2
ZVF9-G0037T4/P0037T4	380	8.5	3.7
ZVF9-G0040T4/P0040T4	380	10	4.0
ZVF9-G0055T4/P0055T4	380	13	5.5
ZVF9-G0075T4/P0075T4	380	17	7.5
ZVF9-G0110T4/P0110T4	380	25	11
ZVF9-G0150T4/P0150T4	380	33	15
ZVF9-G0185T4/P0185T4	380	39	18.5
ZVF9-G0220T4/P0220T4	380	45	22
ZVF9-G0300T4/P0300T4	380	60	30

Inverter Models (G: Constant Torque Load) (P: Fan or Pump Load)	Input Voltage (V)	Rated Output Current (A)	Adaptive Motor Power (KW)
ZVF9-G0370T4/P0370T4	380	75	37
ZVF9-G0450T4/P0450T4	380	90	45
ZVF9-G0550T4/P0550T4	380	110	55
ZVF9-G0750T4/P0750T4	380	152	75
ZVF9-G0900T4/P0900T4	380	176	90
ZVF9-G1100T4/P1100T4	380	210	110
ZVF9-G1320T4/P1320T4	380	253	132
ZVF9-G1600T4/P1600T4	380	300	160
ZVF9-G1850T4/P1850T4	380	360	185
ZVF9-G2000T4/P2000T4	380	380	200
ZVF9-G2200T4/P2200T4	380	420	220
ZVF9-G2500T4/P2500T4	380	480	250
ZVF9-G2800T4/P2800T4	380	540	280
ZVF9-P3150T4	380	610	315

2.6 Technical Indications

Table 2-2 Description Summary for Technical Indications

Item		Item Description
Input	Rated Voltage, Frequency	Single/Three Phase 220VAC, Three Phase380VAC, 50Hz/60Hz
	Allowable Voltage Range	Effective Value of Voltage: 180~230V for Grade 220V; 320~460V for Grade 380V Unbalance Value of Voltage: <3%; Frequency Fluctuation: ≤5%
Output	Rated Voltage	Three Phase: 0~Input Voltage VAC
	Frequency	0~400Hz
Overload Capability		**Model G:** Permanent if overload<110%; 1 min if 110%<overload<150%; 2 sec if 150%<overload<180%; instant if overload≥200%. **Model P:** 1 min if overload<120%; 1 sec if 120%<overload<150%; instant if overload≥180%.
Control Function	Modulation System	Magnetic Flux Vector Pulse-Width Modulation (PWM)
	Regulating Range	1：100
	Frequency Accuracy	Digital Setting: Max. Frequency× ±0.01% Analogue Setting: Max. Frequency× ±0.2%
	Frequency Resolution	Digital Setting: 0.01Hz; Analogue Setting: Max. Frequency×0.1%
	Starting Torque	100% rated torque at 0.50Hz.
	Torque Lifting	Automatic torque lifting: to lift the torque automatically according to the output current. Hand-operated torque lifting: Range: 1~30%
	Slip Compensation	Setting range: 0~20%. The inverter output frequency can be auto-regulated within this range according to the motor load so as to reduce the speed variation of the motor due to load fluctuation.
	Acceleration/ Deceleration time	0.1~6,000 sec, which can be set in sequence.
	Carrier frequency	1.0~13KHz
	V/F curve	1.linear curve 2.quadratic curve

Item		Item Description
Control Function	Automatic energy-saving operation	Auto optimize V/F curve according to load fluctuation to realize energy-saving operation.
	Auto Voltage Regulation	When the network voltage changes, it can regulate PWM output automatically to maintain constant voltage.
	Built-in PID	This can form a convenient closed-loop control system (CLCS), and is applicable to pressure control, flow control and other process control.
Operation Function	Operating instruction	operator panel control, external terminal control and COM control
	Frequency setting	panel potentiometer setting, operator panel ▲▼ setting, external terminal up/down setting, analogue voltage signal or external potentiometer setting, analogue current signal setting, analogue nest setting and 485 COM setting.
	Input Signal	Forward/Reverse signal, multiple speed signal, failure signal, reset signal and etc.
	Output signal	programmable open-collector output impedance, failure signal output
	Analogue output terminal	This can realize the output of DC 0~10V signal, frequency, current and other physical quantity.
Braking Function	Dynamic braking	With an external braking resistor, the maximum braking torque may reach 100%.
	DC braking	This can be selected when the motor starts or stops with the action frequency of 0~20Hz action voltage level of 0~20% and actuation time of 0~30 sec., and this value can be set in sequence.
Other Function		Other functions: Leap frequency, jog function, counter, trace to rotating speed, instant shutdown restarting, frequency upper/lower limitation, acceleration/deceleration mode regulating, frequency meter and voltmeter output, multiple speed/program operation, two-wire/three-wire control, dipolar control, multi-function input terminal selection, failure auto reset and 485 COM.
Protection Function		Protection function: input open-phase protection, over-current protection, overload protection, undervoltage protection, overheating protection and etc.

Item		Item Description
LED display		Real-time display the running state, monitoring parameters, function parameters, diagnostic trouble codes (DTC) and other information of the inverter.
Matching parts		brake assembly, remote operator panel, connecting wire, communication panel
Ambient	Place to be used	Indoor location free from direct exposure to sunlight, high humidity or dew condensation, high levels of dust, corrosive gas, explosive gas, inflammable gas, oil mist, salt and etc.
	Altitude	Below 1,000M
	Ambient Temperature	-10~+45℃ [Bare Machine:-10~+50℃]
	Humidity	20~90%RH without dew condensation
	Vibration	<0.5G
	Storage Temperature	-20~+60℃
	Protective Class	Ip20
Structure	Cooling system	forced air cooling
	Installation	wall mounted or floor-type actuator

Chapter 3 Inverter Installation and Wiring

3.1 Installation

3.1.1 Use the inverter in the following environmental conditions:

- Altitude: Maximum 1000m above sea level
- Ambient Temperature: -10~+45℃ [Bare Machine: -10~+50℃]
- Humidity: 20~90% RH (Non-condensing)
- Ambient: Indoor places free from direct exposure to sunlight, dust, corrosive gas, flammable gas, oil mist, steam, drip and salt.
- Vibration: < 0.5G

3.1.2 Installation Space and Direction

To get better cooling effect and for the convenience of maintenance, the inverter shall be installed vertically with enough space left (refer to Figure 3-1). When two or more inverters are fixed in the same cabinet, it is recommended to fix them in parallel and horizontally to reduce heat produced by them (refer to Figure 3-2). When there is a must to fix them up and down, please fix an insulating board between them so that the heat produced by the lower one could not have direct influence on the upper one (refer to Figure 3-3).

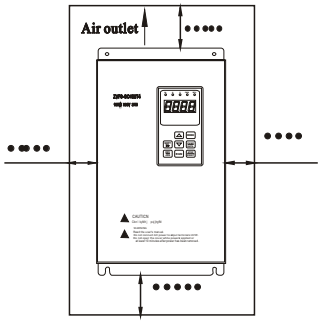


Fig. 3-1
Diagram of
Installation Space

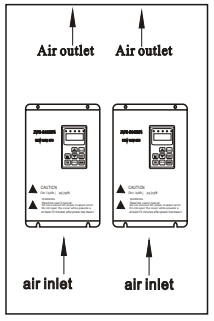


Fig. 3-2
Diagram of
Multi-piece Parallel
Installation

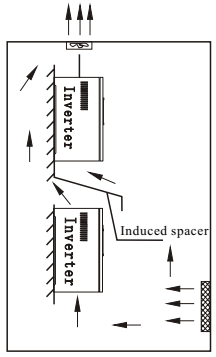


Fig. 3-3
Diagram of
Multi-piece Vertical
Installation

3.1.3 Installation Instructions

WARNING!

● Do not install or operate if the inverter is damaged or has parts missing to prevent injury to personnel or loss of property.
●Be sure the main loop terminal should be tightly connected to the cable. Otherwise, the inverter may be damaged arising from loose connection.
●Be sure the ground terminals of the inverter and the motor must be reliably and properly grounded. Multi-piece inverter should be grounded at one shared point.

COMPULSORY!

● Be sure to install a no-fuse circuit breaker or leakage protective circuit breaker in the side of inverter input power supply to prevent expanding of accident due to an inverter problem.

CAUTION!

● Install the inverter in a proper place with moderate temperature. The higher the ambient temperature is, the shorter the service life of the inverter is.
●Keep any other heat-producing equipment as far away from the inverter as possible. When installing the inverter in an enclosure, maintain the clearance around the inverter and verify the temperature is within the allowable range.

3.2 Parts Dismantling and Installation

3.2.1 Dismantle the upper cover.

1、Dismantle the upper cover of the inverter Model A.
Put a finger into the notch of the lower part of the inverter (as shown in Figure 3-4 where the arrow points), stretch upward for 30~50mm (as shown in Figure 3-5), then push forward to open the upper cover of the inverter.

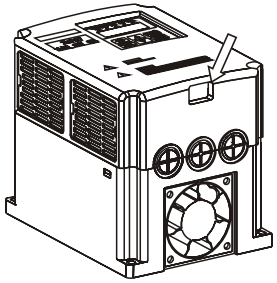


Fig. 3-4 Diagram of dismantling the upper cover of the inverter Model A

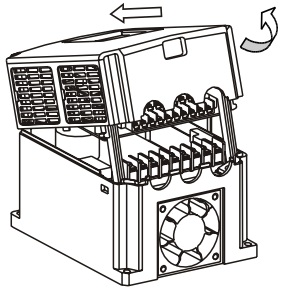


Fig. 3-5 Diagram of dismantling the upper cover of the inverter Model A

2、Dismantle the upper cover of the inverter Model B.
Unscrew two screws of the lower part of the inverter (as shown in Figure 3-6 where the arrow points), stretch upward for 30~70mm (as shown in Figure 3-7), then push forward to open the upper cover of the inverter.

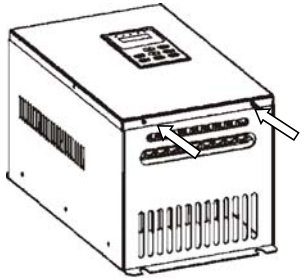


Fig. 3-6 Diagram of dismantling the upper cover of the inverter Model B

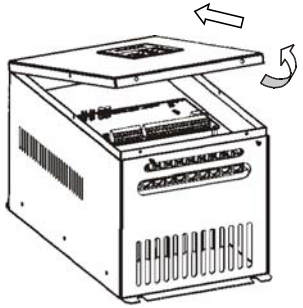


Fig. 3-7 Diagram of dismantling the upper cover of the inverter Model B

3.2.2 Installation of the remote-controlled operator panel and connecting wire

1、Installation of the operator panel and connecting wire of the inverter Model A

Step 1. Open the upper cover of the inverter (as shown in Figure 3-4 and Figure 3-5).

Step 2. Button up with hand at the chink of the upper part of operator panel and remove the operator panel (as shown in Figure 3-8).

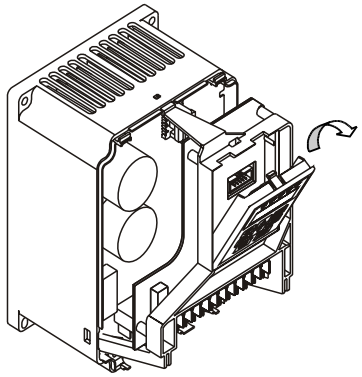


Fig. 3-8 Mounting Diagram of the operator panel and connecting wire of the inverter Model A

Step 3. Fix the jack panel provided in the optional components in the installation position of operator panel (as shown in Figure 3-9).

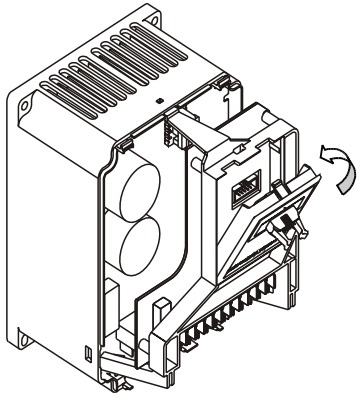


Fig. 3-9 Mounting Diagram of the operator panel and connecting wire of the inverter Model A

Step 4. Install the dismantled upper cover in the previous location, plug the ground end of connecting wire into the slot of jack panel (as shown in Figure 3-10).

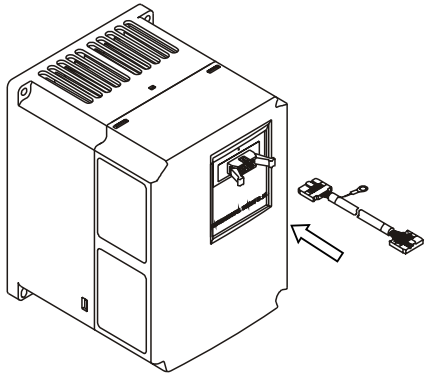


Fig. 3-10 Mounting Diagram of the operator panel and connecting wire of the inverter Model A

Step 5. Put the dismantled operator panel into the installation frame provided in the optional components, fix and fasten it. Plug the other end of connecting wire into the jack panel slot, and then plug the slot into operator panel (as shown in Figure 3-11).

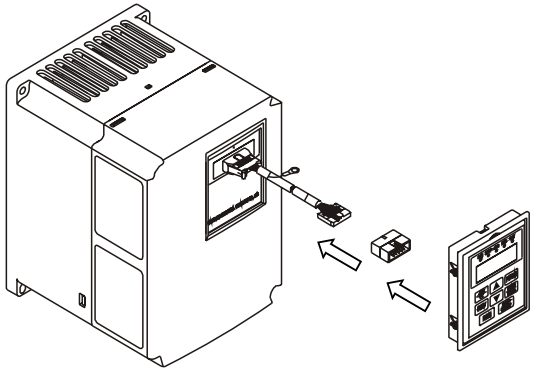


Fig. 3-11 Mounting Diagram of the operator panel and connecting wire of the inverter Model A

2、Installation of the operator panel and connecting wire of the inverter Model B:

Step 1. Open the upper cover of the inverter (as shown in Figure 3-6 and Figure 3-7).
Step 2. Press the direction that the arrow points to strenuously and push outward to remove the operator panel (as shown in Figure 3-12).

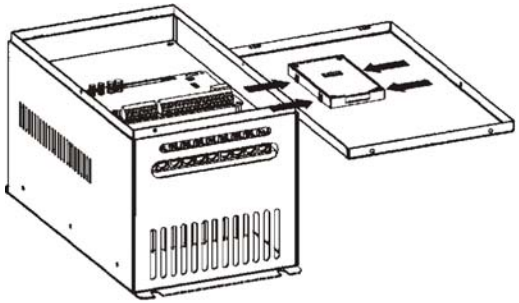


Fig. 3-12 Mounting Diagram of the operator panel and connecting wire of the inverter Model B

Step 3. Plug the connecting wires of the control panel and operator panel into the jack panel provided in the optional components. Put on the upper cover of the inverter, and then fix the jack panel in the installing location of operator panel (as shown in Figure 3-13).

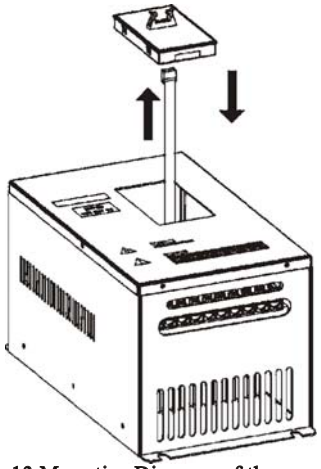


Fig. 3-13 Mounting Diagram of the operator panel and connecting wire of the inverter Model B

Step 4. Plug the grounding end of connecting wire into the slot of jack panel (as shown in Figure 3-14).

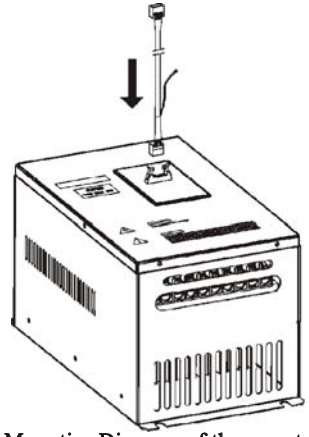


Fig. 3-14 Mounting Diagram of the operator panel and connecting wire of the inverter Model B

Step 5. Fix and fasten the dismantled operator panel, and put the other end of connecting wire into the socket of operator panel (as shown in Figure 3-15).

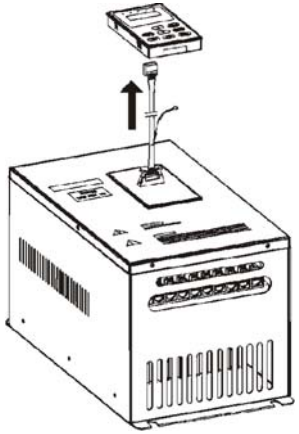


Fig. 3-15 Mounting Diagram of the operator panel and connecting wire of the inverter Model B

3.3 Inverter Wiring

3.3.1 Basic System Description on Inverter Wiring

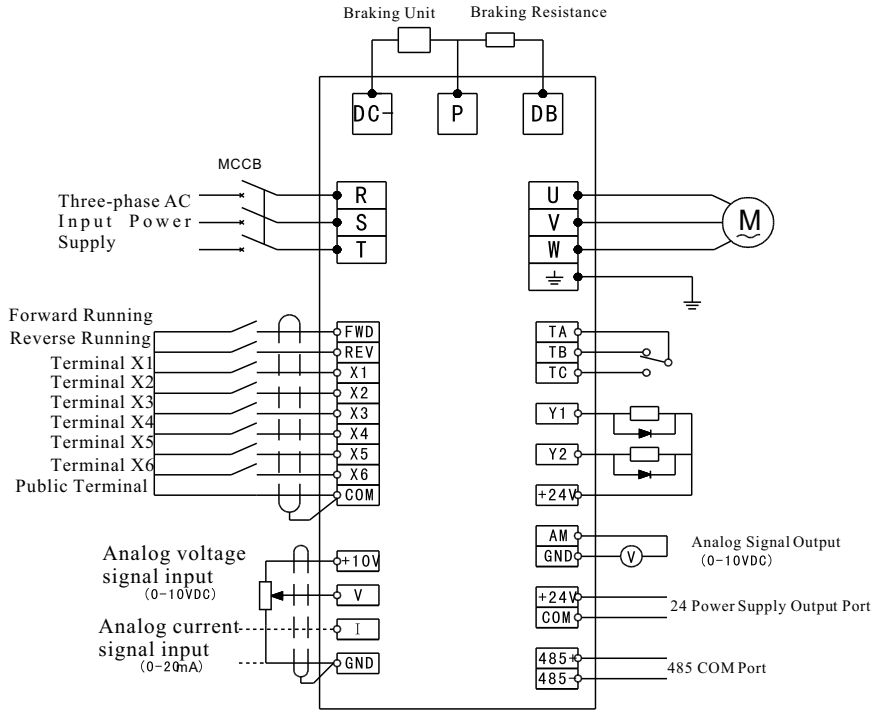


Fig. 3-16 Basic System Description on Wiring

Applicable to Model: ZVF9-G0007S2～G0037S2 ZVF9-G0007T2～G0220T2
ZVF9-G0007T4～G0300T4 ZVF9-P0150T4～P0370T4

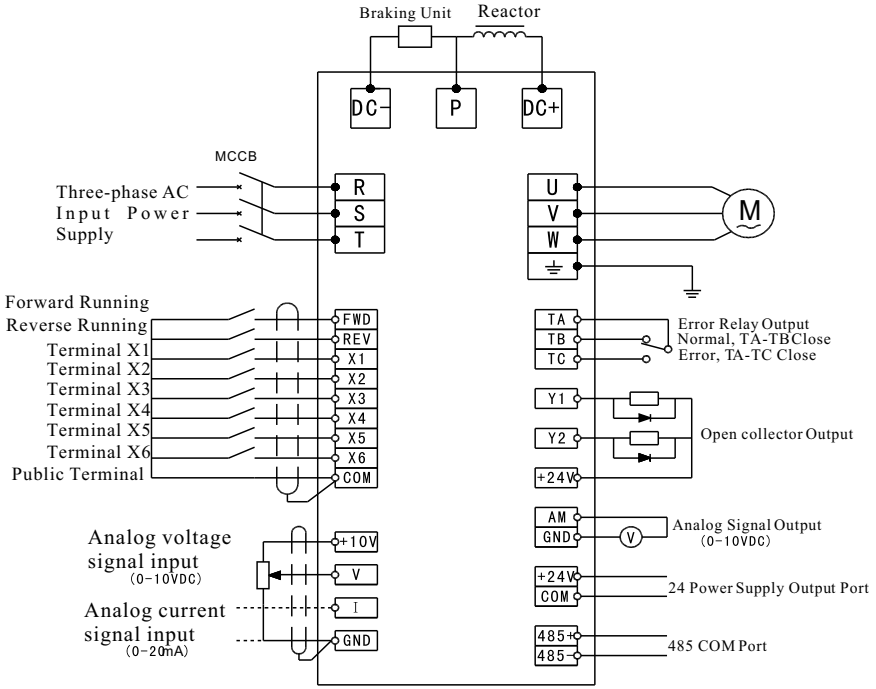


Fig. 3-17 Basic System Description on Wiring

Applicable to Model: ZVF9-G0370T4～G2800T4 ZVF9-P0450T4～P3150T4

3. 3. 2 Cautions for Wiring:

Hazard!

●Wait at least 10 minutes after power OFF before opening the upper cover of the inverter.
●Verify the charge lamp indicator is OFF before proceeding the work, and be sure that the voltage value of main loop terminal P and DC is less than 36VDC.
●The internal wiring of the inverter should be operated only by authorized qualified personnel.

WARNING!

●Verify the rated input voltage of the inverter is matched with AC power supply. Otherwise, there is the possibility of damage to the inverter.
●Install in order and only operate wiring after finishing main parts installation. Otherwise, there is an electric shock or damage to the inverter.
●Do not perform over-voltage withstand to the inverter, for this had been done properly before EX-factory.
●Be sure to install a non-fuse circuit breaker in the input power supply side of the inverter to prevent expanding of accident due to an inverter problem, which may cause damage to the distribution equipment or lead to fire.
●Be sure to connect the ground terminal and the motor casing to the ground wire which must be copper core. The diameter of the wire should conform to the relevant national standard. The ground resistance should be less than 10Ω.

FORBIDDEN

●DO NOT connect AC power supply to the output terminals marked, U, V, W, Otherwise, there will be damage to the inverter.
●DO NOT connect control terminals (except terminals marked "TA", "TB" and "TC") to AC 220V power supply, which may cause damage to the inverter.

TIPs

● When the open-ended output terminal of the collector connects to the inductive load, i.e., the relay coil, do insert a diode at each end of the load in parallel.
●The control wire in the inverter or the control cabinet should be at least 100mm away from the power cable. DO NOT put them in the same metallic channel. If the signal wire and the power cable intersect, the interference will be smallest if they intersect at an angle of 90o. The control wire must adopt STP (shielded twisted pair wire); the shielded layer must connect to the terminal GND; and the power wire is recommended to use metallic shielded cable.

TIPs

●The unavoidable strong electromagnetic interference of the inverter may have bad influence on all the electrical equipment and meters in the same environment. To reduce interference, the output cable of the inverter can be inserted in the metal pipe connecting to the ground or in the metallic shielded cable, and connect the metallic shielded layer to the ground. In addition, a magnetic loop put on the output cable is also effective to reduce interference.

3.3.3 Instruction on Main Circuit Terminals

The main circuit terminals are shown as in Figure 3-18~3-22.

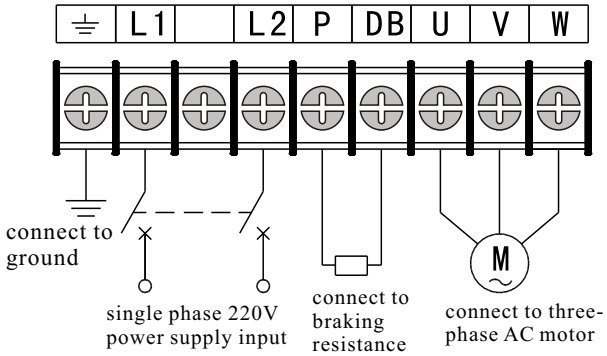


Fig. 3-18 Diagram of Main Circuit Terminals (1)

Applicable to Model: ZVF9-G0007S2~G0037S2

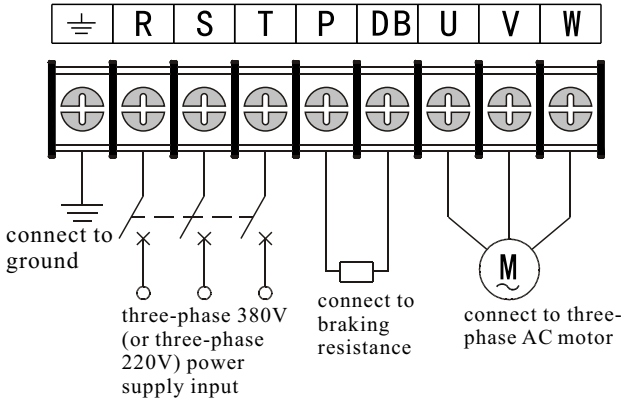


Fig. 3-19 Diagram of Main Circuit Terminals (2)

Applicable to Model:
ZVF9-G0007T2~G0055T2, ZVF9-G0007T4~G0075T4
ZVF9-P0015T4~P0110T4

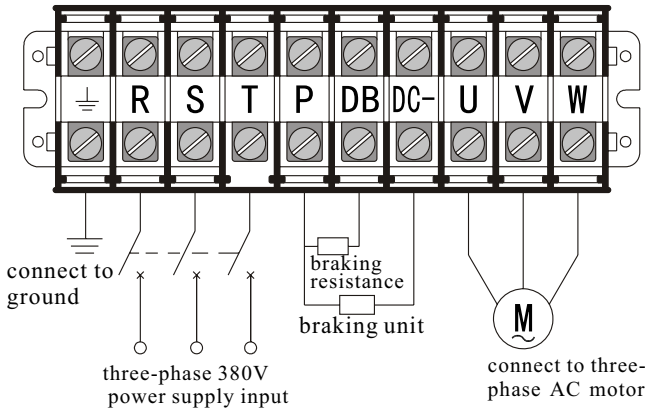


Fig. 3-20 Diagram of Main Circuit Terminals (3)

Applicable to Model: ZVF9-G0075T2~G0220T2, ZVF9-G0110T4~G0300T4
ZVF9-P0150T4~P0370T4

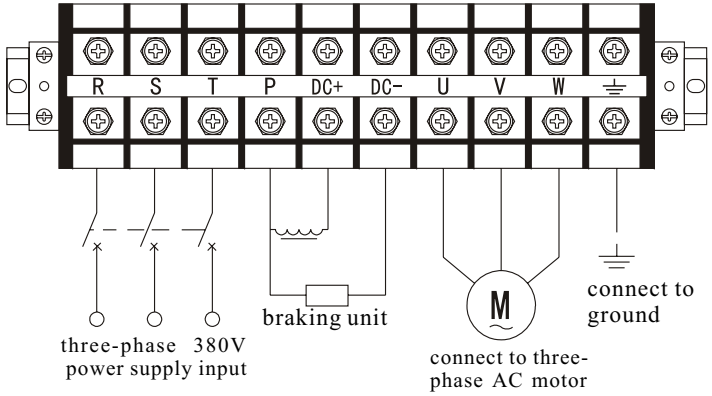


Fig. 3-21 Diagram of Main Circuit Terminals (4)

Applicable to Model: ZVF9-G0370T4~G1100T4, ZVF9-P0370T4~P1320T4

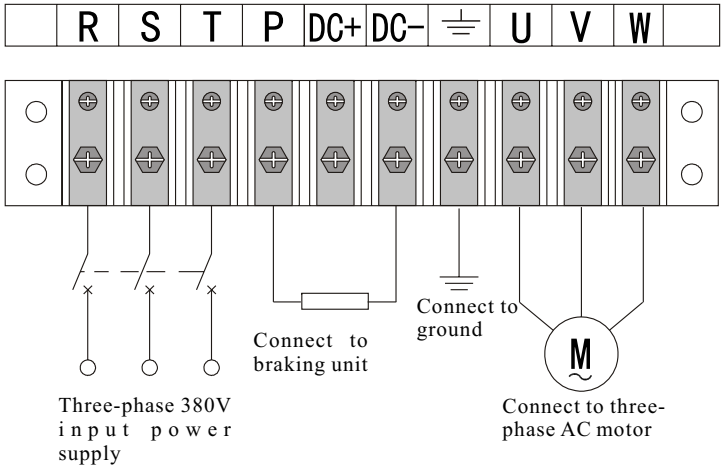

R S T P DC+ DC- U V W
Connect to braking unit
Connect to ground
M
Three-phase 380V input power supply
Connect to three-phase AC motor

Fig. 3-22 Diagram of Main Circuit Terminals (5)

Applicable to Model：ZVF9-G1320T4～G1850T4， ZVF9-P1600T4～P2000T4

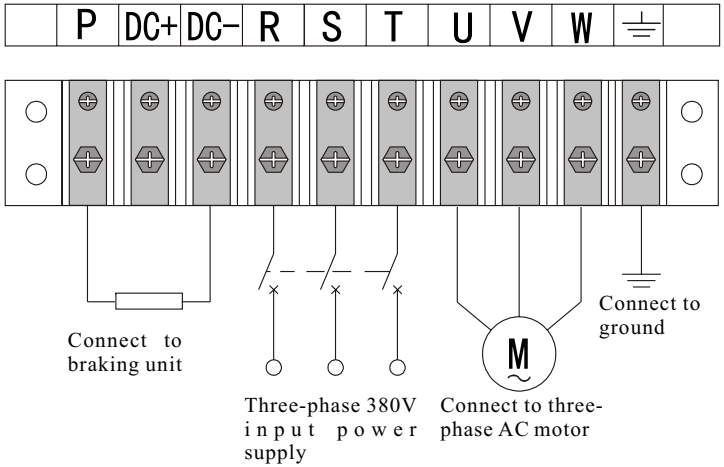

P DC+ DC- R S T U V W
Connect to braking unit
Three-phase 380V input power supply
M
Connect to three-phase AC motor
Connect to ground

Fig. 3-23 Diagram of Main Circuit Terminals (6)

Applicable to Model：ZVF9-G2000T4～G2800T4， ZVF9-P2200T4～P3150T4

2、Function Description of Main Circuit Terminals

Table 3-1 Main Loop Terminals Function Description

Terminal Signals	Function Description
R、S、T	Power supply input terminals connecting to three-phase 380V or 220V AC input power supply
L1、L2	Power supply input terminals connecting to single phase 220V AC input power supply
U、V、W	Inverter output terminals connecting to three-phase AC motor
P、DB	External braking resistance terminals connecting to both ends of external braking resistance
P、DC-	External braking unit terminals; terminal P connects to the positive end of the braking unit and DC- connects to the negative end.
P、DC+	External braking Reactor terminals
⏚ G	Ground terminal or ground wire

Tips

●The three-phase input power supply terminals (R, S and T) do not differ on phase sequence and can be connected arbitrarily.
●If the motor counter rotates (reverses) when the output terminals U, V and W connect to three-phase motor, just exchange two phases of U, V and W arbitrarily.
●A braking unit is required to be installed inside the inverter under 15KW. If an external braking resistance is required, just connect to the external braking resistance between terminal P and terminal DB.
●An inverter higher than 18.5KW has no internal braking unit, so it has no DB terminal. If a braking torque is needed, please connect to the external braking units （including braking unit and braking resistance）between P and DC-.
●ZVF9-G1320T4/P1600T4 or even updated model is matched with DC reactor. If an inverter has no internal DC reactor, just fix a DC reactor between P and DC+. When performing this step, it is required to remove the short-circuit ring, then connect to the reactor (applicable to the inverter of 30KW or higher power).

3.3.4 Description on Control Circuit Terminals

1、Control circuit terminals shown in Figure 3-23 and 3-24

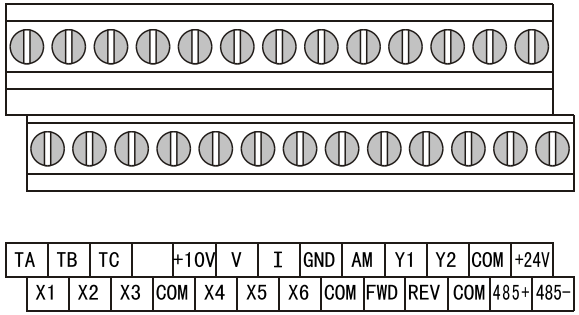


Fig. 3-23 Control Circuit Terminals (1)

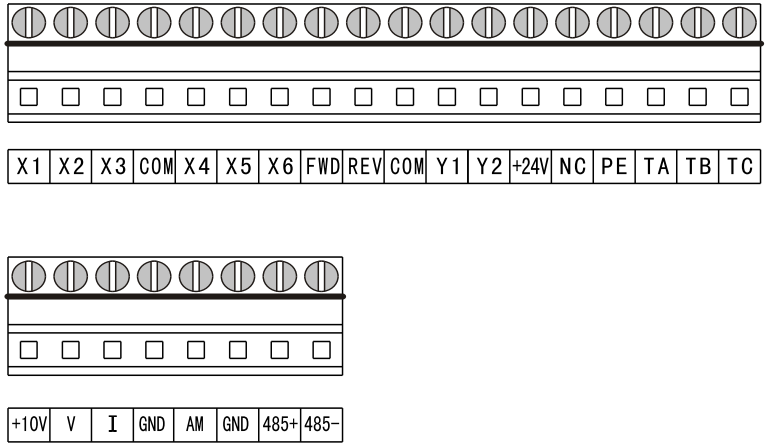


Fig. 3-24 Control Circuit Terminals (2)

3.3.4 Description on Control Circuit Terminals

Table 3-2 Function Description of Control Circuit Terminals

Types	Terminal Symbols	Function Description	Electrical Specifications
Public Port	COM	Numeral Signal Public Terminal	
Running Control Terminal	FWD	Forwarding when FWD-COM shortcuts, decelerating and stopping when FWD-COM is open.	INPUT, 0~24 V power level, low level valid, 5mA
	REV	Reversing when REV-COM shortcuts, decelerating and stopping when REV-COM is open.	
Multi-function Input Terminal	X1	Valid only when there is a short-circuit between Xn (n=1, 2, 3, 4, 5, 6) and COM. The functions can be set by the parameter F111~F116 separately.	INPUT, 0~24 V power level, low level valid, 5mA
	X2		
	X3		
	X4		
	X5		
	X6		
Multi-function Output Terminal	Y1	Multi-function open-collector output is defined as on-off output terminal, whose function is set by the parameter F117~F118 with reference of COM.	OUTPUT, Maximum Current Load I ≤ 50mA
	Y2		
Others	PE	Ground Terminal	
	NC	Vacant Terminal	

Table 3-2 Function Description of Control Circuit Terminals

Types	Terminal Symbols	Function Description	Electrical Specifications
Public Port	GND	Analog Signal Public Terminal	
Analog Input Terminal	+10V	External analog preset power supply connecting to potentiometer together with terminal GND and V. The frequency can be set as required.	INPUT, 10V
	V	Analog voltage signal input, with reference of GND.	INPUT, 0~10V
	I	Analog current signal input, with reference of GND	INPUT, 0~20mA
Analog Output Terminal	AM	Analog voltage output connecting to voltmeter or frequency meter with corresponding output ranging from "0" to the maximum frequency, and reference of GND.	OUTPUT, 0~10V
Power Supply Interface	+24V	24VDC Power Supply Output (Control Power Supply)	24VDC-100mA
Failure Output Terminal	TA	Failure relay contact output used to detect the protection function of the inverter. When the inverter is normal, TA-TB turns on and TA-TC turns off; when the inverter is failure, TA-TB turns on and TA-TC turns off.	Contact rated value: 250VAC-3A 250VAC-1A 30VDC-1A
	TB		
	TC		

3.4 Wiring Diagram of Inverter System

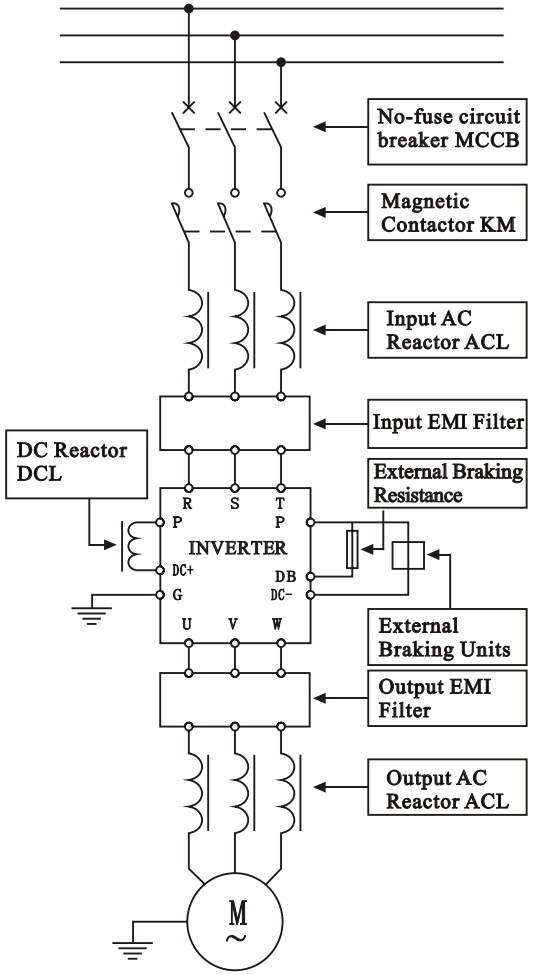


Fig. 4-25 Connection between the Inverter and Optional Accessories

Tips

●The circuit breaker has the function of over-current protection, which can avoid extension of external equipment failure. Do pay attention to the capacity of circuit breaker when installing. Refer to Table 3-3 to select the circuit breaker.

●The magnetic contactor is used to disconnect from the main power supply in case of inverter failure, and prevent restarting after power-off or inverter failure.

● The input AC reactor can reduce influence arising from unbalance of three-phase AC power supply, improve the power factor of the inverter input side and reduce damage to the inverter when it is connected to large capacity motor which may result in damage to the rectifier circuit. It is necessary to configure an AC reactor when any of the following occurred:

①The power supply unbalance exceeds 3%.

②The power capacity is 500KVA at least and it is 10 times higher than the inverter capacity.

③The power factor is used to compensate the connection or disconnection of the capacity, and sudden change of network voltage caused by other reasons.

It is recommended to install a reactor with derating voltage of 3%.

●The input and output EMI filters are used to minimize the magnetic or radio frequency interference (RFI) produced by the network or the inverter.

●The braking units are used to consume the energy fed back by some heavy potential energy or inertia load to the inverter, so as to avoid inverter tripping arising from over-tension pumping voltage while giving a quick shutdown to the inverter.

●The output AC reactor can filter out with effect the higher harmonic components in the inverter output current and reduce the electromagnetic interference (EMI) due to ultra harmonics. Also, it can improve current waveform, decrease noise and temperature rise of a running motor and enhance the stability of motor running. To avoid influence of leakage current due to distributed capacity of the cable, it is necessary to install an output AC reactor if the motor cable is longer.

Table 3-3 Capacity of Break Switch & Section Area of Wire

Inverter Models	Break Switch (A)	Main Circuit (mm^2)		Control Wire (mm^2)
		Input Wire	Output Wire	
ZVF9-G0007T2/S2	10	1.5	1.5	0.75
ZVF9-G0015T2/S2	16	2.5	2.5	0.75
ZVF9-G0022T2/S2	20	4	4	0.75
ZVF9-G0037T2/S2	32	4	4	0.75
ZVF9-G0055T2	50	6	6	0.75
ZVF9-G0075T2	63	8	8	0.75
ZVF9-G0110T2	100	10	10	0.75
ZVF9-G0150T2	125	16	16	0.75
ZVF9-G0185T2	160	25	25	0.75
ZVF9-G0220T2	200	25	25	0.75
ZVF9-G0007T4	5	1.0	1.0	0.75
ZVF9-G0015T4/P0015T4	10	1.0	1.0	0.75
ZVF9-G0022T4/P0022T4	10	1.5	1.5	0.75
ZVF9-G0037T4/P0037T4	20	2.5	2.5	0.75
ZVF9-G0040T4/P0040T4	20	2.5	2.5	0.75
ZVF9-G0055T4/P0055T4	30	4	4	0.75
ZVF9-G0075T4/P0075T4	40	4	4	0.75
ZVF9-G0110T4/P0110T4	50	6	6	0.75
ZVF9-G0150T4/P0150T4	63	8	8	0.75
ZVF9-G0185T4/P0185T4	100	10	10	0.75
ZVF9-G0220T4/P0220T4	100	16	16	0.75
ZVF9-G0300T4/P0300T4	125	16	16	0.75

Table 3-3 Capacity of Break Switch & Section Area of Wire

Inverter Models	Break Switch (A)	Main Circuit (mm²)		Control Wire (mm²)
		Input Wire	Output Wire	
ZVF9-G0370T4/P0370T4	160	25	25	0.75
ZVF9-G0450T4/P0450T4	200	25	25	0.75
ZVF9-G0550T4/P0550T4	200	35	35	0.75
ZVF9-G0750T4/P0750T4	250	50	50	0.75
ZVF9-G0900T4/P0900T4	315	50	50	0.75
ZVF9-G1100T4/P1100T4	400	70	70	0.75
ZVF9-G1320T4/P1320T4	400	70	70	0.75
ZVF9-G1600T4/P1600T4	500	95	95	0.75
ZVF9-G1850T4/P1850T4	500	95	95	0.75
ZVF9-G2000T4/P2000T4	600	120	120	0.75
ZVF9-G2200T4/P2200T4	600	120	120	0.75
ZVF9-G2500T4/P2500T4	800	180	180	0.75
ZVF9-G2800T4/P2800T4	800	180	180	0.75
ZVF9-/P3150T4	1000	180	180	0.75

Chapter 4 Operator panel and its Operation

4.1 Operator panel and Description

The inverter ZVF9 series has two operator panels, with potentiometer or without potentiometer. The standard model does not have a potentiometer before EX-factory. If a user needs an inverter with a potentiometer, he should tell the manufacturer in advance.

4.1.1 1.1 Operator Panel Outlay

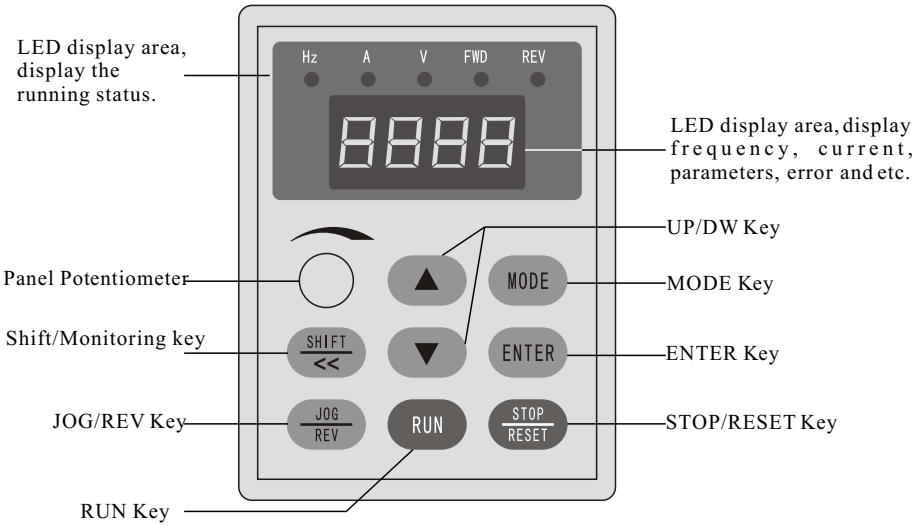


Fig. 4-1 Diagram of ZR01 Operator Panel
Applicable to Model: ZVF9-G0007T2/S2～G0037T2/S2, ZVF9-G0007T4～G0055T4
ZVF9-P0015T4～P0075T4

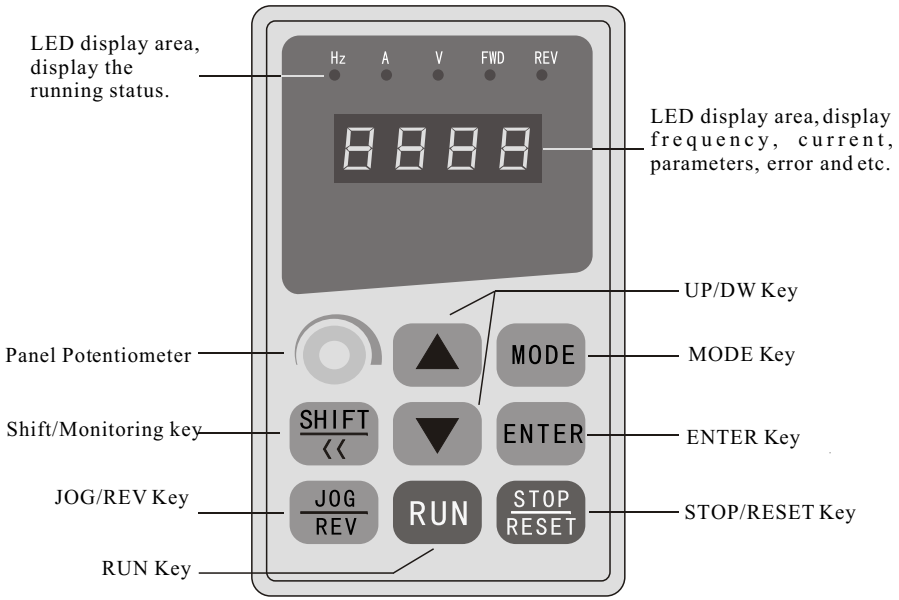


Fig. 4-2 Diagram of ZR02 Operator Panel
Applicable to Model：ZVF9-G0075T4～G280T4，ZVF9-P0110T4～P3150T4
ZVF9-G0055T2～G0220T2

4.1.2 Function Description on Key

RUN	Run key. When the operating instruction is to select operator panel control (F010=0), press this key and the inverter begins to run.
STOP RESET	Stop/Reset key. When the operating instruction is to select operator panel control (F010=0), the inverter is in normal running state. Press this key to stop running. When the inverter is in the state of failure alarming, press this key to solve failure and return to normal state.
MODE	Mode shifting key. Press this key to realize mode switching from monitoring parameter to function parameter.
ENTER	Enter/Store key. Press this key to confirm current state of the inverter or store current parameter value.
JOG REV	Jog/Reverse key. Press this key to realize jog or reserve function, and decide jog or reverse function by selecting the parameter F039. The factory default setting is jog function.
SHIFT	Shift/Monitoring key. When a data needs modifying, press this key to select the modifier bit of data. In the status of monitoring, press this key to display the status parameter.
▲	Increase key: Press this key, the data or parameter code will go up. Press it still, the modifying speed upward will rise.
▼	Decrease key. Press this key, the data or parameter code will go down. Press it still, the modifying speed upward will fall.

4.1.3 Function Description on Operator Panel Indicator Lights

Table 4-1 LED Status Description

Display Status	Function Description
● Hz	When this indicator light is ON, LED displays frequency data.
● A	When this indicator light is ON, LED displays current data.
● V	When this indicator light is ON, LED displays voltage data.
● FWD	When this indicator light is ON, the inverter is in the state of forward running.
● REV	When this indicator light is ON, the inverter is in the state of reverse running.
●●●●●	When all of the above 5 light is ON, the inverter is in the state of alarming.

4.1.4 Working mode and display status of the function keyboard

1. Mode of Monitoring State

Press MODE key, the inverter enters into monitoring state mode (LED displays Fd□□). Under this mode, press ▲/▼ to decide what to be monitored (i.e., a running parameter or failure record).

2. Mode of Function Status

Repress MODE key, the inverter will enter the mode of function status (LED displays F□□□). Under this mode, press ▲/▼ or plus "SHIFT" key to decide the function parameter to be checked or modified.

3.Power On/Off Display

The LED displays P.oFF when the inverter is just powered on or powered off properly.

Tips

●In any event, the operator panel will automatically return to the Monitoring Mode if there is no key entry in 2 continuous minutes.
●In the mode of monitoring, the frequency value will be modified by pressing ▲/▼ on the operator panel when setting F009=0.

3.The correspondence between display symbols of the parameter Fd13 and external input terminal status in the monitoring mode is shown below:

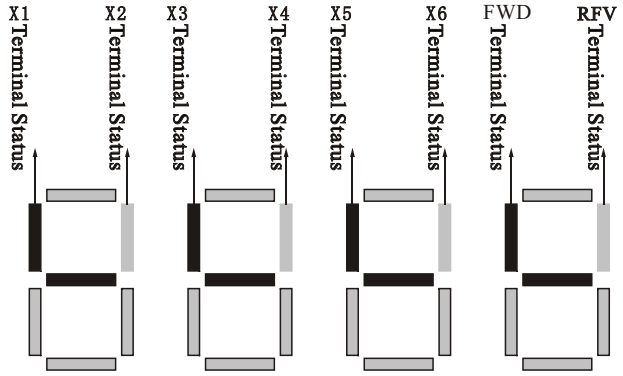


Fig. 4-3 Relationship between input terminal status and display symbols in monitoring mode

▮: Terminal turns ON, valid input of terminal

▯: Terminal turns OFF, invalid input of terminal

4.1.5 Use of Operator Panel

①Modification of monitoring status parameter (change the motor rotating speed from Fd00 to Fd04).

Order	Operation Steps	LED Display	Description
1		0.0	**Initiating mode before operation**
2	**Press** MODE	Fd00	Enter monitoring status.
3	**Press** △ Continuously	Fd04	Set the monitoring status to 4 (motor rotating speed).
4	**Press** ENTER	1500	Confirm the monitoring status and display the motor rotating speed.

②function of monitoring status parameter

Order	Operation Steps	LED Display	Description
1		0.0	**Initiating mode before operation**
2	**Press** MODE	Fd00	Enter monitoring status.
3	**Repress** MODE	F000	Enter the function parameter mode.
4	**Press** △ Continuously	F020	Set the function code to jog frequency.
5	**Press** ENTER	10.00	Enter the status of jog function parameter setting.
6	**Press** △ Continuously	20.00	Set the jog frequency to 20.00Hz.
7	**Press** ENTER	F020	Exit the status of jog frequency parameter setting and save the data.
8	**Press** MODE	0.0	Return to monitoring mode.

③ function of monitoring status parameter

Order	Operation Steps	LED Display	Description
1		0.0	Initiating mode before operation
2	**Press** MODE	Fd00	Enter monitoring status.
3	**Repress** MODE	F000	Enter the function parameter mode.
4	**Press** △ Continuously	F009	Set the unit position of the function code to 9.
5	**Press** ENTER	1	Enter the status of parameter value setting of the frequency set mode.
6	**Press** ▽	0	Set the parameter value of the frequency set mode to 0.
7	**Press** ENTER	F009	Exit the status of parameter value setting and save the data.
8	**Press** MODE	00	Return to monitoring mode.

④ **Parameter Initiating**

Order	Operation Steps	LED Display	Description
1		0.0	Initiating mode before operation
2	**Press** MODE	Fd00	Enter monitoring status.
3	**Repress** MODE	F000	Enter the function parameter mode.
4	**Press** △ Twice	F002	Set the unit position of the function code to 2.
5	**Press** ENTER	0	Enter the status of function parameter value setting of parameter initializing.
6	**Press** △ Twice	2	Set the parameter value to 2, which means the initialization of parameter value.
7	**Press** ENTER	F002	Parameter initializing finished and return to the status of function codes.
8	**Press** MODE	00	Return to monitoring mode.

4.2 Monitoring Parameter Display

Table 4-2 Monitoring Parameter LED Display List

CATEGORY	DISPLAY CODE	NAME	UNIT
MONITORING DISPLAY PARAMETERS	Fd00	Output frequency	Hz
	Fd01	Set frequency	Hz
	Fd02	Output current	A
	Fd03	Output voltage	V
	Fd04	Motor rotation speed	r/min
	Fd05	Running linear speed	
	Fd06	Set linear speed	
	Fd07	DC bus bar voltage	V
	Fd08	Power module thermometer	℃
	Fd09	PID set value	
	Fd10	PID feedback value	
	Fd11	Counter value	
	Fd12	Total time of current running	h
	Fd13	Enter terminal status parameter	

CATEGORY	DISPLAY CODE	NAME		UNIT
MONITORING DISPLAY PARAMETERS	Fd14	1st diagnostic trouble codes	0: OC-1 Acceleration running over current 1: OC-2 Deceleration running over current 2: OC-3 Steady-speed running over current 3: OU-1 Acceleration running over voltage 4: OU-2 Deceleration running over voltage 5: OU-3 Steady running over voltage 6: OU-4 Over voltage when power off 7: LU Under voltage ofrunning 8: LP Input side open-phase 9: Ler Power module failure 10: OH Radiator over heat 11: OL-1 Inverter overload 12: OL-2 Motor overload 13: EF external equipment failure 14: CE-1 Remain 15: CE-2 Current detection error 16: CE-3 Keyboard communication failure 17: CE-4 COM error 18～20 Remain	
	Fd15	2nd diagnostic trouble codes		
	Fd16	3rd diagnostic trouble codes		
	Fd17	4th diagnostic trouble codes		
	Fd18	DC bus bar voltage of the latest failure		V
	Fd19	Output current of the lasted failure		A
	Fd20	Output frequency of the lasted failure		Hz
	Fd21	Total running time of the lasted failure		S
	Fd22	Module temperature of the lasted failure		℃

4.3 Failure Parameters Display

Table 4-3 Failure Codes LCD Display List

CATEGORY	DISPLAY CODE	Failure
MONITORING DISPLAY PARAMETERS	OC-1	Acceleration running over current
	OC-2	Deceleration running over current
	OC-3	Steady-speed running over current
	OU-1	Acceleration running over voltage
	OU-2	Deceleration running over voltage
	OU-3	Steady running over voltage
	OU-4	Over voltage when power off
	LU	Under voltage of running
	LP	Input side open-phase
	Ler	Power module failure
	OH	Radiator over heat
	OL-1	Inverter overload
	OL-2	Motor overload
	EF	external equipment failure
	CE-1	Remain
	CE-2	Current detection error
	CE-3	Keyboard communication failure
	CE-4	COM error
	Remain	

Chapter 5 Operation of Inverter

5.1 Trial Operation

5.1.1 Safety Instruction on Trial Operation

HAZARD

●Never open the front cover while the inverter is power ON. Otherwise, there is the danger of electric shock.
●Never touch the inner side of the inverter while it is power ON, nor put any foreign matter, i.e., rod or other matter inside the inverter. Otherwise, it may result in serious damage to the equipment or death to personnel.

CAUTION

●Motor insulation should be checked before the inverter is used for the first use or reused after a long-term idle. Be sure the insulation resistance measured is no lower than 5Ω .
●An inverter stored for half a year or longer must be given power up test before use, so that the main circuit filtering capacity of the inverter could be recovered. Do raise the voltage gradually by using a voltage regulator to some rated value before it is recharged. Generally, the recharging period lasts 1~2 hours. Otherwise, there is the danger of electric shock or exposure.

5.1.2 Check before trial operation.

The following steps should be inspected and confirmed before the trial operation of the inverter:
●Be sure that the application ambient and installation for the inverter is in accordance with the requirements specified in Clause 3.1.
●Be sure that the main circuit is correctly wired. The input power supply of the inverter must be connected to the terminal R, S and T. The output terminal U, V and W must be connected to the motor.
●Be sure that the ground terminal is reliably and properly grounded.
●Be sure all the switches and terminals are in proper state of off or shutdown.
●Be sure there is no short cutting or short to ground of all the terminals and electrified parts.
●Be sure all the terminals, connectors and screws are tightly fastened.
●Be sure the motor has no other loads.

5.1.3 Trial Operation

Try this step only after careful inspection as mentioned in the clauses of 5.1.2. While in trial operation, it is suggested that the motor has vacant load to avoid damage to this mechanical equipment arising from incorrect operation. During this period, if the operating instruction is F010, then the RUN/STOP key control (factory default setting) of the operator panel must be selected. The trial operation steps must be followed as shown in Table 5-1 below.

Table 5-1 Trial Operation Steps

Order	Operation	Description
c	Switch on, inverter energized.	When energized, the inverter is in the state of readiness and LED displays 0.00Hz.
2	Press ▲/▼ till LED displays 5.00Hz.	Set the frequency to 5.00Hz. This step can be left out if the displayed frequency is already 5.00Hz when energized.
3	Press RUN	Motor begins rotating, the frequency displayed on the inverter LED raises from 0.00Hz to 5.00Hz, and the built-in cooling fan begins working.
4	Keep a close eye on the following points: ①Is there any abnormal vibration or noise when the motor runs? ②Is there any tripping or other abnormality of the inverter? ③Does the motor run in the correct way? ④Are the values of rotation speed and frequency correct?	If there is any anomaly or tripping, stop running immediately and cut off the power supply. Please refer to Chapter 7, find the trouble causes, then proceed trial operation again after troubleshooting. If the motor runs in the wrong direction, change arbitrary two-phase connection of the output terminal U, V or W.
5	Press ▲ continuously till LED displays 50.00Hz.	The motor accelerates rotating and the displayed frequency rises from 5.00Hz to 50.00Hz. Go to the next step if everything is normal.
6	Press ▼ continuously till LED displays 0.00Hz.	The motor decelerates rotating and the displayed frequency falls from 50.00Hz to 0.00 Hz. Go to the next step if everything is normal.
7	Press STOP	The inverter stops outputting, the motor stops running and the trial operation ends. If everything is normal, please repeat the operation for several times.

5.2 Cautions for Operation

All the inverter functions are determined by set parameters. ZVF9 series inverter parameters consist of the function codes F000~F166, see the detail in Chapter 6 of this manual. The displayed parameter value of each function code is the factory default value of the inverter before EX factory, which can be modified by the user according to his needs. It is noteworthy that a user shall change the relative function parameters when he amends a parameter because some of the parameters are inter-related. It is not recommended to modify the set parameter value if there is no special requirement, for the factory default setting has been done properly. Otherwise, this may cause damage to the inverter or equipment due to error parameter.
In case there is an error alternation of the parameter, please initialize the parameter with reference to the operation method in the clause 4.1.5④ Parameter Initializing （Restoring to Factory Default Settings）.

5.2.1 Cautions for Operation

HAZARD

●Do not open the front cover while the inverter is powered ON. Otherwise, there is the danger of electric shock.
●Do not touch the inner side of the inverter while the power is ON, nor put any foreign matter, i.e., rod or other matter inside the inverter. Otherwise, it may result in serious damage to the equipment or death to personnel.
●Do not operate the inverter with wet hands.
●If the Retry Mode is set, please put a warning sign like “KEEP CLEAR” or “HAZARD” in an eye-catching place before the equipment to avoid sudden restart of the equipment after a trip stop that may result in injury to personnel.

WARNING

●If the inverter runs at a frequency higher than 50Hz, DO confirm it is within the speed range acceptable by your motor bearing and mechanical device. Otherwise, there is the danger of damage to the motor.
●Derating should be done before use due to less effective of heat dissipation when a general motor runs at a low frequency. If it is a constant torque load, then a forced method or a special variable frequency motor should be used to release heat.
●DO cut off the power supply of an inverter set aside for a long time to avoid foreign matter or other things enter in it which may cause damage to the inverter or even lead to fire.

CAUTION

●If the inverter is used beyond the range of allowable working voltage, then an extra step-up or step-down voltage transformer shall be configured.
●Due to thin air in a place where the altitude is higher than 1,000m, the heat dissipation of inverter will be less effective. Hence derating should be done before use. In general, when the height rises by 1,000m, the rated voltage of the inverter shall reduce by 10%. Refer to Figure 5-1 for details of the derating curve.

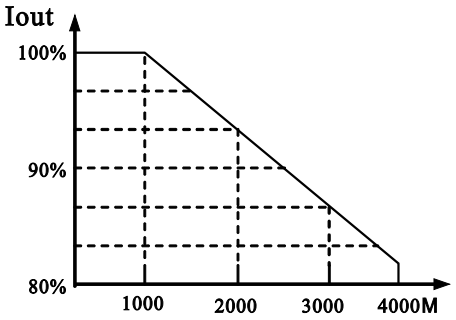


Figure 5-1 Diagram of Inverter Derating Curve

FORBIDDEN

●DO NOT touch the radiator or charging resistor of the inverter with hand(s). Otherwise, there is the possibility of getting scalded.
●DO NOT proceed direct start-stop operation frequently with a contactor or any other switch devices in the inverter input side. As large charging current exists in the main circuit of the inverter, frequent power-on/off may produce cumulative effect resulting in heat fatigue of inverter components and great reduction of service life of the inverter.

COMPULSORY

●In case abnormalities occur, such as smoke, off odor, strange sound, DO cut off the power supply immediately, overhaul the equipment or turn to the agent for help via phone call.

5.3 Examples of Use

This manual provides following examples for users' reference on the use of inverter.

5.3.1 Eg. 1: Run or stop the inverter with operator panel, and feed the frequency with operator panel potentiometer.

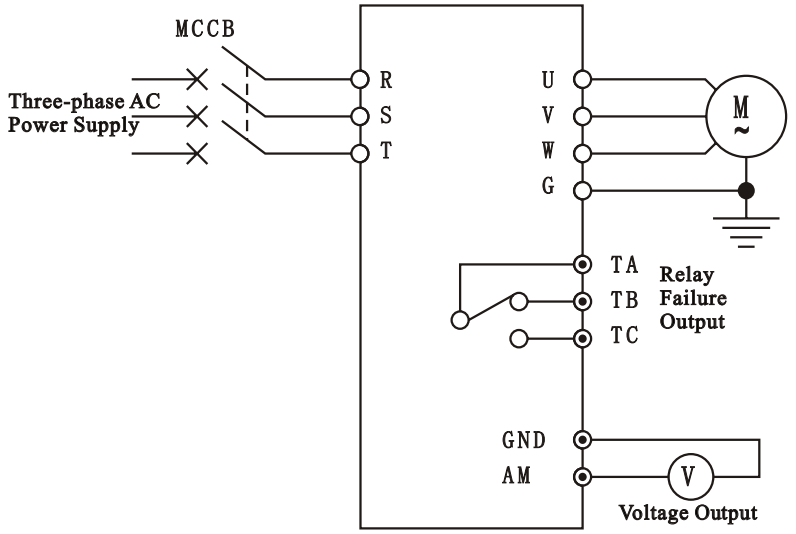


Figure 5-2 Eg.1 Wiring Diagram

●F009—This indicates the selection of frequency setting. If setting this value to "0", the frequency will be fed by the potentiometer.
●F010—This indicates the selection of operating instruction. If setting this value to "0", the inverter will be controlled by the operator panel.
●Run or stop the inverter with RUN STOP RESET keys on the operator panel.
●Rotate the operator panel potentiometer to adjust the speed.

Eg.2: Run or stop the inverter with external terminals, and feed the frequency with external potentiometer.

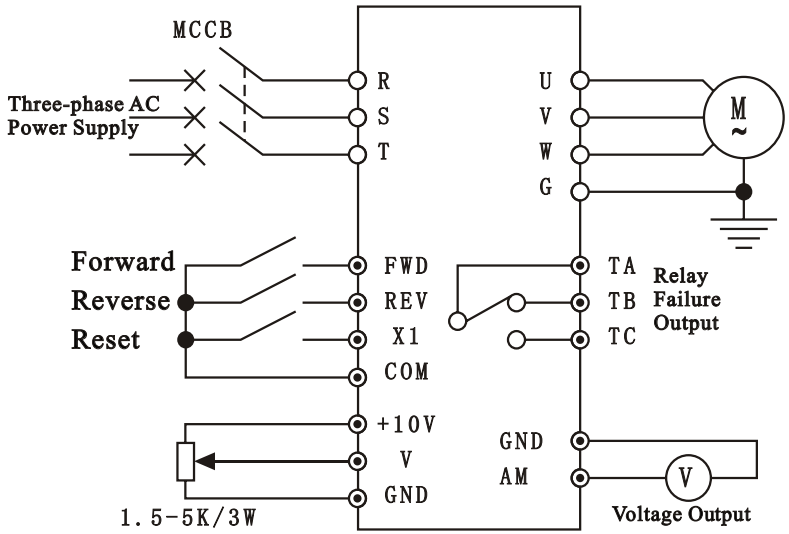


Figure 5-3 Wiring Diagram of Eg. 2

●F009—This indicates the selection of frequency setting. If setting this value to "3", the frequency will be set by external voltage signal V or external potentiometer.

●F010—This indicates the selection of operating instruction. If setting this value to "1", the inverter will be controlled by external terminals.

●F111—This indicates the selection of the function of input terminal X1. If setting this value to "15", then the external reset input is performed.

●FWD-COM off, motor forwards. REV-COM on, motor reverses. FWD, REV-COM on or off at the same time, inverter stops running. X1-COM on, failure resets.

●Realize speed control by regulating the value of "V" (controlled by 1.5~5K/3W potentiometer).

Eg.3: Run or stop the inverter with external terminals by adopting operation manner at multistage speed.

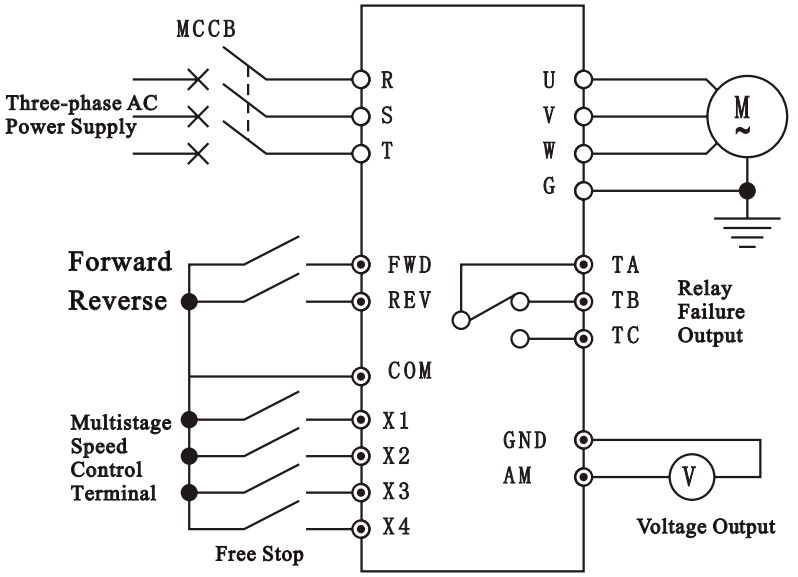


Figure 5-4 Eg.3 Wiring Diagram

●F010—This indicates the selection of operating instruction. If setting this value to "1", the inverter will be controlled by external terminals.

●F111~F113—This indicates the selection of multi-function terminal X1~X3, set to 1, 2 and 3 multistage speed control terminal in order.

●F114—(X4 multi-function selection). Select 8---External free stop.

●F081~F087—Multi-speed frequency setting, which can be set in 7 stages. Factory defaults are preferred.

●FWD—COM off, motor forwards; REV-COM off, motor reverses.
FWD、REV—COM on or off simultaneously, inverter stops.

●Connecting an arbitrary terminal of X1~X3 to COM (7 pairs of such complex in total), the inverter will run at the frequency of multistage speed selected by X1~X3.

5.3.4 Eg.4 Run or stop the inverter with external terminals, feed the frequency with external potentiometer and multiple motors run in parallel.

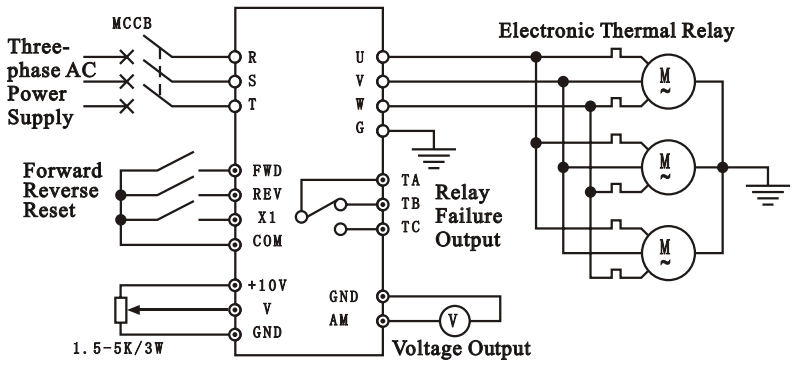


Figure 5-5 Eg.4 Wiring Diagram

●F009—This indicates the selection of frequency setting. If setting this value to "3", the frequency will be set by external voltage signal V or external potentiometer.

●F010—This indicates the selection of operating instruction. If setting this value to "1", the inverter will be controlled by external terminals.

●F111—This indicates the selection of the function of input terminal X1. If setting this value to "15", then the external reset input is performed.

●FWD-COM off, motor forwards. REV-COM off, motor reverses. FWD, REV-COM on or off simultaneously, inverter stops running. X1-COM off, failure resets.

●Realize speed control by regulating the value of "V" (controlled by 1.5~5K/3W potentiometer).

●Each set of motor uses thermal relay to have an overload protection.

●The value of electronic thermal relay is determined by the parameter F148 through tests.

5. 3. 5 Eg.5: Multiple Inverter Ratio Interlocking Operation Control

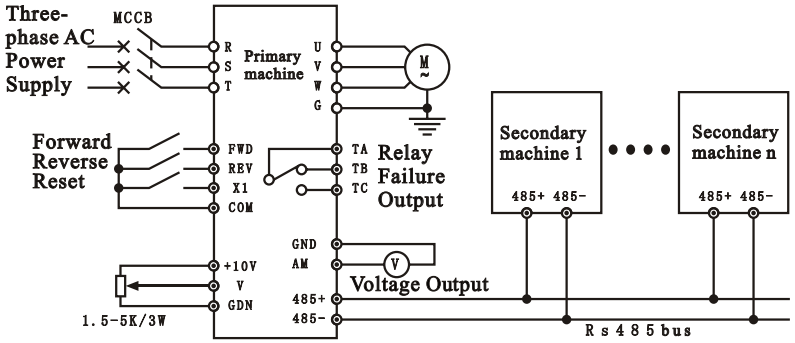


Figure 5-6 Eg.5 Wiring Diagram

Primary Machine Setting

●F155—Local communication address: Set this address to 0 and make the inverter as a host.

●F156—Communication data format: Set all the data formats of the inverter to the same value.

●F157—Communication baud rate: Set all the baud rates of the inverter to the same value.

Secondary Machine Setting

●F009—Selection of frequency setting: Set this value to 6, the frequency will be set by COM (serial communication).

●F010—Selection of operating instruction: Set this value to "2", the inverter will be controlled by COM.

●F155—Local communication address: Set this address to 1~30, which means 30 sets of inverters can be connected at this address maximally).

●F156—Communication data format: Be the same as the primary machine.

●F157—Communication baud rate: Be the same as the primary machine.

●F158—Interlocking setting ratio: 0.01~10, set as per user's demand.

Only such operations can be done on the master inverter, such as start, stop and so the like. Other operations should be matched with the master inverter.

5.3.6 Eg.6: PID Constant Pressure Water Supply Control

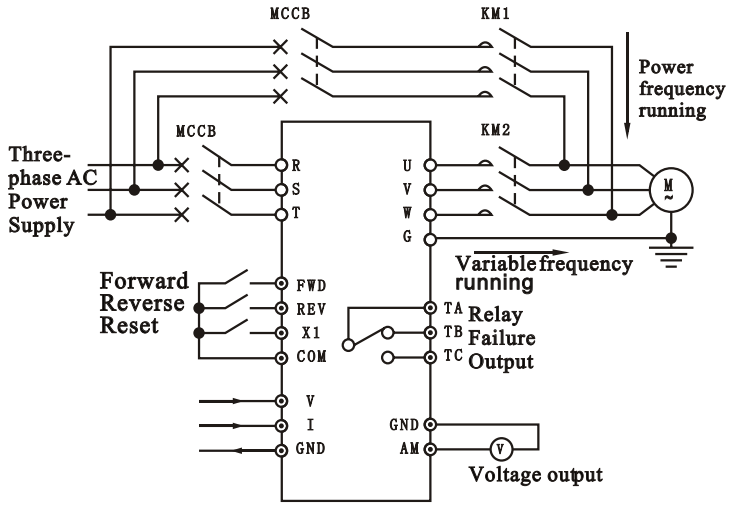


Figure 5-7 Eg.6 Wiring Diagram

●F130—PID motion selection: Set the value to 1, then PID selection is valid.
●F131—PID given path selection: Set the value to 0, then the selection of ▲/▼ is valid.
●F132—Given digital setting: Set according to actual demand. Set it to 5.0V herein.
●F133—PID Feedback path selection: Set the value to 1, then external current is selected.
●F134—PID Feedback flow gain: Set according to actual demand. No regulation here.
●F135—PID feedback polarity selection: Set the value to 0, then positive is selected.
●F136—Proportional gain P: Set according to actual demand. No regulation here.
●F137—Integral time constant TI: Set according to actual demand. No regulation here.
●F138—Derivative time constant DI: Set according to actual demand. No regulation here.
●F139—Sampling period: No need to alter.
●F140—Deviation limit: Set according to actual demand. No regulation here.

●F141—Sleep threshold: Set according to actual demand. No regulation here.
●F142—Revoke threshold: Set according to actual demand. No regulation here.
●F143—Check-out time of sleep/revoke threshold: Set according to actual demand. No regulation here.
Other parameters remain the factory defaults. Corresponding initiate modes and other operations shall be modified in the light of actual conditions and requirements.

WARNING

●The contactor KM1 and KM2 must be designed in interlocked manner to realize converting between power frequency and variable frequency. It is forbidden to close simultaneously. Otherwise, it may lead to permanent damage to the inverter.

Chapter 6 Description of Function Parameters

6.1 Schedule of Function Parameters

Tips

●The mark “ √ ” indicates the setting value of parameter can be modified no matter when the inverter is shutdown or running.
●The mark “ × ” indicates the setting value of parameter can be modified only when the inverter is shutdown, and can not be modified when the inverter is running.
●The mark “ — “ indicates the parameter can be displayed only and can not be modified.

6.1.1 Basic Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F000	Software Version number					–
F001	Inverter Specification Display					–
F002	Parameter Initiating / Removing Failure Record	0:Parameter is in the status of modification. 1:Remove failure record information. 2:All the parameters return to factory default settings.		1	0	X
F003-007	Remain					–
F008	Setting of operation frequency	Operation frequency is set within 0.00Hz~upper limit of the frequency.	Hz	0.01	50.00 Hz	√
F009	Selection of frequency setting manner	0:Set by the potentiometer of operator panel. 1: Set by external terminal ▲/▼ 2:Set by analog voltage signal V (0~10VDC) 3:or the external potentiometer 4:Set by analog current signal I (0~20mA). 5:Set by analog input assembly. 6:Set by 485 COM.		1	1	√
F010	Selection of operation control mode	0:Controlled by RUN/STOP key on operator panel. 1: Controlled by external terminal 2:Controlled by 485 COM.		1	0	√
F011	Selection of motor rotating direction	0:Unidirectional with the set direction 1:Opposite to the set direction. 2:No reversal.		1	0	√
F012	Maximum output frequency	50.00Hz~400.0Hz	Hz	0.01	50.00Hz	X
F013	Selection of V/F curve mode	0:Linearity (Constant torque mode) 1:Square (Quadratic torque mode)		1	0	X
F014	Selection of acceleration /deceleration manner	0:Linear 1:S curve		1	0	X
F015	Accelerating period 1	0.1~6000.0S	S	0.1	Determined in accordance with specifications	√
F016	Decelerating period 1	0.1~6000.0S	S	0.1	Determined in accordance with specifications	√
F017	Upper limit of frequency	Lower limit ~ maximum output frequency	Hz	0.01	50.00Hz	X

6. 1. 1 Basic Functions (Continued)

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F018	Lower limit of frequency	0.00Hz～Upper limit of frequency	Hz	0.01	0.00Hz	X
F019	Remain					–

6. 1. 2Jog Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F020	Jog running frequency	0.00～50.00Hz	Hz	0.01	10.00Hz	√
F021	Jog accelerating period	0.1～6000.0S	S	0.1	10.0S	√
F022	Jog decelerating period	0.1～6000.0S	S	0.1	10.0S	√

6.1.3 Start & Stop Function

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F023	Selection of starting mode	0:Start at the starting frequency 1:Brake first and startthen 2: Start inthe mode of rotation speed tracking		1	0	√
F024	Starting frequency	0.00～20.00Hz	Hz	0.01	0.00Hz	√
F025	Starting frequency holding time	0.0～30.0S	S	0.1	0.0S	X
F026	Starting DC braking voltage	0～20%	%	1	0%	X
F027	Starting DC braking time	0.0～20.0S	S	0.1	0.0S	X
F028	FWD/REV dead time	0.0～10.0S	S	0.1	2.0S	X
F029	Halt mode	0:Decelerating stop 1: Free stop		1	0	√
F030	Shutdown DC braking starting frequency	0.00～20.00Hz	Hz	0.01	3.00Hz	X
F031	Shutdown DC braking voltage	0～20%	%	1	0%	√
F032	Shutdown DC braking time	0.0～30.0S	S	0.1	0.0S	X
F033	Remain					–

6.1.4 Auxiliary Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F034	Selection of Power On display items	0:Current output frequency ofthe inverter 1:Current set frequency ofthe inverter 2:Output current 3:Output voltage 4:Motor rotating speed 5:Linear speed of running 6:Linear speed setting 7:DC bus bar voltage 8:Power module temperature 9:PID target value 10:PID feedback value 11:Counter value 12:Cumulative time of current running (Hours) 13:Input terminal status	Hz	1	0	√
F035-36	Remain					–
F037	Display coefficient of linear speed	0.01～100.0		0.01	1.00	√
F038	Display coefficient of closed-loop control	0.001～10.00		0.001	1.000	√
F039	Selection of REV/JOG key function	0:REV 1:JOG		1	1	X
F040	Two-wire/Three-wire running control	0:Two-wire controlmode 1 1:Two-wire controlmode 2 2:Three-wire control mode		1	0	X
F041	Accelerating period 2	0.1～6000.0S	S	0.1	Determined in accordance with specifications	√
F042	Decelerating period 2	0.1～6000.0S	S	0.1	Determined in accordance with specifications	√
F043-44	Remain					–

6.1.5 Special Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F045	Selection of automatic energy-saving operation	0:Forbidden 1:Allowable		1	0	X
F046	Setting of slip compensation	0～20%	%	0.1	0.0%	X
F047	Selection of AVR function	0:Forbidden 1:Allowable		1	0	X
F048	Torque lifting	0～30%	%	1	Determined in accordance with specifications	√
F049	Carrier frequency	1.0～13KHz	KHz	0.1	Determined in accordance with specifications	X
F050	Leap frequency 1	Lower limit of frequency~ upper limit of frequency	Hz	0.01	0.00Hz	√
F051	Range of leap frequency 1	0.00～10.00Hz	Hz	0.01	0.00Hz	√
F052	Leap frequency 2	Lower limit of frequency~ upper limit of frequency	Hz	0.01	0.00Hz	√
F053	Range of leap frequency 2	0.00～10.00Hz	Hz	0.01	0.00Hz	√
F054	Reference frequency of acceleration/deceleration period	10.00～400.0Hz	Hz	0.01	50.00	√
F055	Selection of retry mode	0:Forbidden 1:Allowable		1	0	X
F056	Wait time for restart mode	0.0～20.0S	S	0.1	1.0S	X
F057	Frequency arrival checkout range (FAR)	0.00～15.00Hz	Hz	0.01	5.00Hz	√
F058	Setting of FDT level	0.00Hz~upper limit of frequency	Hz	0.01	10.00Hz	√
F059	PDT lagged value	0.00～30.00Hz	Hz	0.01	1.00Hz	√
F060	Overload pre-alarm level	20～110%	%	1	100%	X
F061	Overload pre-alarm action period	0.0～15.0S	S	0.1	1.0S	X
F062	Remain					-
F063	Remain					-

6.1.6 Analog Input/Output Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F064	Lower limit of analog voltage input	0.0V～[F065]	V	0.1	0.0V	√
F065	Upper limit of analog voltage input	[F064]～10.0V	V	0.1	10.0V	√
F066	Lower limit of analog current I	0.0mA～[F067]	mA	0.1	4.0mA	√
F067	Upper limit of analog current I	[F066]～20.0mA	mA	0.1	20.0mA	√
F068	Bipolarity zero offset of analog input	0～100%	%	1	0%	X
F069	Biasing direction of the frequency corresponding to the lower limit of analog input	0:Positive bias 1:Negative bias		1	0	X
F070	Biasing direction of the frequency corresponding to the Upper limit of analog input	0:Positive bias 1:Negative bias		1	0	X
F071	Corresponding set frequency of Min. analog input	0.00Hz~upper limit of frequency	Hz	0.01	0.00Hz	√
F072	Corresponding set frequency of Max. analog input	0.00Hz~Lower limit of frequency	Hz	0.01	50.00Hz	√
F073	Delay period of analog input signal	0.1～5.0S	S	0.1	0.5S	X
F074	Analog meter output AM	0:Running frequency 1:Motor rotation speed 2:Output current 3:Output voltage 4:PID feedback value		1	0	√
F075	Proportional gain of analog meter output AM	50%～200%	%	1	100%	√
F076	Analog meter output AM bias	0.00～3.00V	V	0.01	2.00V	√

6.1.6 Analog Functions (Continued)

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F077	Analog input assembly setting	0: External voltage V+External current I 1: External voltage V−External current I 2: External current I+External voltage V 3: External current I−External voltage V		1	0	√
F078	Remain					−
F079	Remain					−

6.1.7 Multi-speed / Program Running Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F080	Selection of programmable multistage speed running	0:Non operation 1:Single cycling 2:Continuous cycling 3:Maintaining ultimate value after singe cycling 4:Wobbulation running		1	0	X
F081	Output frequency at the first stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	5.00Hz	√
F082	Output frequency at the second stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	10.00Hz	√
F083	Output frequency at the third stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	20.00Hz	√
F084	Output frequency at the fourth stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	30.00Hz	√
F085	Output frequency at the fifth stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	40.00Hz	√
F086	Output frequency at the sixth stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	45.00Hz	√
F087	Output frequency at the seventh stage speed	Lower limit of frequency~ upper limit of frequency	Hz	0.01	50.00Hz	√
F088	First stage speed running time	0.0~6500.0S	S	0.1	20.0S	X

6.1.7 Multistage Speed/Programmable Running Functions (Continued)

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F089	Selection of running direction at the first stage speed	0:FRD 1:REV		1	0	X
F090	First stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F091	Second stage speed running time	0.0~6000.0S	S	0.1	20.0S	X
F092	Selection of running direction at the second stage speed	0:FRD 1:REV		1	0	X
F093	Second stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F094	Third stage speed running time	0.0~6000.0S	S	0.1	20.0S	X
F095	Selection of running direction at the third stage speed	0:FRD 1:REV		1	0	X
F096	Third stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F097	fourth stage speed running time	0.0~6000.0S	S	0.1	20.0S	X
F098	Selection of running direction at the fourth stage speed	0:FRD 1:REV		1	0	X
F099	Fourth stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F100	Fifth stage speed running time	0.0~6000.0S	S	0.1	20.0S	X
F101	Selection of running direction at the first stage speed	0:FRD 1:REV		1	0	X
F102	Fifth stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F103	Sixth stage speed running time	0.0~6000.0S	S	0.1	20.0S	X
F104	Selection of running direction at the sixth stage speed	0:FRD 1:REV		1	0	X
F105	Sixth stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F106	Seventh stage speed running time	0.0~6000.0S	S	0.1	20.0S	X
F107	Selection of running direction at the seventh stage speed	0:FRD 1:REV		1	0	X
F108	Seventh stage speed add-subtract time	0.0~6000.0S	S	0.1	20.0S	√
F109	Remain					−
F110	Remain					−

6. 1. 8Functions of Input/Output Terminals

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F111	Function selection of multi-function input terminal X1	0:No function 1:Multistage speed selection 1 2:Multistage speed selection 2 3:Multistage speed selection 3 4:Accelerating/decelerating period terminals 5:Remain 6:FRD JOG control 7:REV JOG control 8:Free stop control 9:Frequency raising instruction (UP) 10:Frequency decreasing instruction (DOWN) 11:External equipment failure input 12:Easy PLC pause 13:Three-wire running control 14:DC braking instruction 15:External reset input 16:Input of decelerating shutdown control 17:Counter zero-clearance input 18:Counter impulse signal input (The input ofcounter impulse signal terminal X6 is valid.)		1	0	X
F112	Function selection of multi-function input terminal X2			1	0	X
F113	Function selection of multi-function input terminal X3			1	0	X
F114	Function selection of multi-function input terminal X4			1	0	X
F115	Function selection of multi-function input terminal X5			1	0	X
F116	Function selection of multi-function input terminal X6			1	0	X

6. 1. 8Functions of Input/Output Terminals (Continued)

F117	Function selection of collector output terminal Y1	0:Indication for “in operation” 1:Frequency/Speed arrival signal (FAR) 2:Frequency/Speed level detecting signal (FDT) 3:Inverter Under-voltage lockout 4:External Failure Input 5:Upper limit of output frequency arrival 6:Lower limit of output frequency arrival 7:Inverter zero rotary “in operation” instruction 8:Programmable multistage speed running ends 9:Inverter overload alarm signal 10:Count to output		1	0	√
F118	Function selection of collector output terminal Y2			1	0	√
F119	Remain					–
F120	Remain					–

6. 1. 9Counter Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F121	Selection of counting modes	0 : Invalid 1 : Up count mode 2 : Down count mode		1	0	X
F122	Counting value	0～9999		1	1	X
F123	Counting coefficient	0～9999		1	1	X
F124	Count to option processing	0 : Stop counting 1 : Recounting		1	0	X
F125	Remain					–

6. 1. 10 Motor Parameters

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F126	Motor rated frequency	50. 00～400. 0Hz	Hz	0. 01	50. 00Hz	X
F127	Motor rated voltage	1～500V	V	1	Determined in accordance with specifications	X
F128	Motor rated current	0. 1～999A	A	0. 1	Determined in accordance with specifications	X
F129	Motor rated rotating speed	1～9999r/min	r/min	1	1450	X

6. 1. 11 PID Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F130	PID action selection	0:Invalid 1:Valid		1	0	X
F131	Selection of PID target value setting mode	0:Set by operator panel ▲/▼ key 1:Set by external voltage signal V(0~10VDC) 2:Set by external current signal I (0~20mA) 3:Set by 485 COM		1	0	X
F132	PID target value setting	0. 00～10. 00V	V	0. 01	0. 0V	X
F133	PID Selection of feedback conditions	0:Set by external voltage signal V（0~10VDC） 1:Set by external current signal I（0~20mA）		1	0	
F134	PID feedback flow gain	0. 01～10. 00		0. 01	1. 00	X
F135	PID feedback polarity selection	0:+ 1:-		1	0	√
F136	Proportional gain (P)	0. 01～10. 00		0. 01	0. 50	√
F137	Integral time constant TI	0. 0～100. 0S	S	0. 1	10. 0S	√
F138	Differential time constant DI	0. 0～10. 0S	S	0. 1	0. 0S	X

6. 1. 11 PID Functions (Continued)

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F139	Sampling period	0. 01～1. 00S	S	0. 01	0. 10S	X
F140	Deviation limit	0. 0～20%	%	0. 1	0. 0%	√
F141	Sleep threshold	F142～100. 0%	%	0. 1%	90. 0%	√
F142	Revoke threshold	0. 0%～F141	%	0. 1%	0. 0%	√
F143	Check-out time for sleep/revoke threshold	0. 0～6000. 0S	S	0. 1	0. 0S	√
F144	Remain					-

6.1.12 protecion functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F145	Overload & overheat protection method	0:Inverter Stop Output 1:Current-limiting running		1	0	X
F146	Inverter input open-phase protection	0:Forbidden 1:Allowable		1	1	X
F147	Over-voltage stall proof function	0:Forbidden 1:Allowable		1	1	X
F148	Motor thermal relay protection coefficient	30%～110%	%	1	100%	X
F149	Selection of automatic current-limiting function	0:Forbidden 1:Allowable		1	1	X
F150	Acceleration over-current stall proof level	40%～200%	%	1	150%	X
F151	Constant speed over-current stall proof level	40%～200%	%	1	150%	X
F152	Failure self-resetting times	0～3		1	0	X
F153	Failure self-resetting interval	2～30S	S	1	5S	X
F154	Remain					-

6.1.13 485 Communication Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F155	Local address of COM	1~30 (0: Main station setting)		1	1	X
F156	Data format of COM	0: No parity 1:Even parity 2:Odd parity (1-bit starting location, 8-bit data location, 1-bit stop location)		1	0	X
F157	COM baud rate	0:1200 1:2400 2:4800 3:9600 4:19200 5:38400		1	3	X
F158	Selection of COM linking ratio	0.01~10		0.01	1.00	√

6.1.14 Other Functions

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F159	Selection of parameter protection	0:All the parameters are allowable to be modified, but some parameters can not be modified when the inverter is in operation. 1:Other parameters are prohibited to be modified except the Fig. setting frequency and this parameter. 2:All the parameters are prohibited to be modified except this parameter.		1	0	√

6.1.14 Other Functions (Continued)

Function Code	Name	Range of setting	Unit	Minimum Unit	Factory Default Setting	Operation Modification
F160	Remain					-
F161	Actual running time(S)		S			-
F162	Actual running time(H)		H			-
F163	Frequency power failure memory	0: No memory 1: memory		1	1	√
F164	Ventilator fan control	0: Fan continuous running 1: Fan-controlled running		1	1	X
F165	PWM adaptive control	0: Invalid 1: Valid		1	1	X
F166						-

6.2 Detailed Instructions on Function Parameters

F000 Software Edition No. Setting Range:None Factory Default Value: *.*

This parameter is used to view the inverter software edition. It can be displayed only and cannot be modified.

F001 Display of the inverter specifications Setting Range:None Factory Default Value: *.*

This parameter is used to view the specification of the inverter. The rated voltage, current and maximum carrier frequency of the inverter is related to this parameter. Please check and make sure it is the right one that you've ordered with reference to the table below.

220V series/kW	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22		
Rated current (A)	4.0	7.5	10	16.5	25	33	49	65	75	90		
Maximum carrier frequency	8KHz						5KHz					

380V series/kW	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37
Rated current (A)	2.3	3.7	5.0	8.5	10	13	17	25	33	39	45	60	75
Maximum carrier frequency	8KHz									5KHz			

380V series/kW	45	55	75	90	110	132	160	185	200	220	250	280
Rated current (A)	90	110	152	176	210	253	300	360	380	420	480	540
Maximum carrier frequency	5KHz											

F002 Parameter initiating/Clear failure record Setting Range: 0～2 Factory Default Value: 0

0: Indicates the parameter is in the modification status. This indicates the inverter is in the normal status of data reading and writing.
1: Removal of failure records.
When setting the parameter to "1", all the failure records will be deleted.
2: Data initiating
When setting the parameter to "2", all the parameters will restore factory defaults.

F003～F007 Remain

F008 Running frequency setting Setting Range:0.00Hz～Upper limit of frequency Factory Default Value:50.00Hz

When the frequency setting mode selects ▲/▼ (F009=1) on the operator panel, this parameter will be the initial setting frequency. In the condition of monitoring mode, the frequency can be modified directly by ▲/▼ key on the operator panel.

Tips

- The running frequency upper value is limited by the upper limit of frequency (F017) and the lower value is limited by the lower limit of frequency (F018).
- When the inverter runs at programmable multistage speed, F008 is also the set frequency at the first stage speed.

F009 Selection of frequency setting mode Setting Range:0～6 Factory Default Value: 1

This function is used to select the setting mode of inverter running frequency.
0: Set by the operator panel potentiometer.
1: Set by operator panel ▲/▼ key.
2: Set by external terminal UP/DW.
3: Set by the external analog voltage signal V (0~10VDC) or the external potentiometer.
4: Set by analog current signal I (0~20mA).
5: Set by analog input assembly.
6: Set by 485 COM. (serial communication).

Tips

- See F077 for analog input assembly setting.
- When the frequency setting mode selects "2" (F009=2), which means to set the frequency by external terminal UP/DW, one of the multi-function input terminals X1～X6 must select "9" which means the frequency goes up and another must select "10" which means the frequency goes down (see F111~F116 for detail). Otherwise, this function will be invalid. Then the short circuit between the selected terminals and COM terminals can lead to frequency UP/DW separately.

F010	Selection of operation control mode	Setting Range:0～2	Factory Default Value: 0

This function is used to set the control modes when the operation commands such as FWD, REV, JOG and STOP are given to the inverter.

0: Controlled by RUN or STOP key on the operator panel.

Run or stop the motor by pressing RUN, STOP or REV/JOG key on the operator panel.

1: Controlled by external terminal(s)

Run or stop the motor by connecting or disconnecting the external terminal FWD/REVCOM.

2. Controlled by 485 COM.

Run or stop the motor through 485 COM port.

F011	Selection of motor rotating direction	Setting Range:0～2	Factory Default Value: 0

The function is used to change the running direction of the motor.

0: Unidirectional with the set direction

1: Opposite to the set direction.

2: No reversal.

F012	Maximum Output Frequency	Setting Range:50.00～400.0Hz	Factory Default Value: 50.00 Hz

This function is used to set the allowable maximum frequency of the inverter, as shown in f4 of Fig. 6-1.

The f2 in this Fig. is generally defined as the basic frequency, the output frequency corresponding to the rated voltage output.

The Vmax in this Fig. is the maximum output voltage of the inverter.

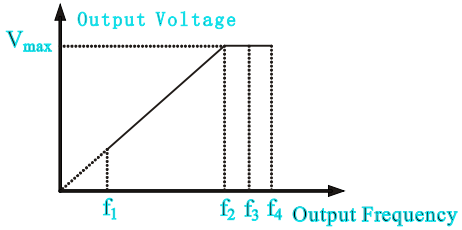


Fig. 6-1 Diagram of Voltage Frequency

F013	Selection of V/F Curve Modes	Setting Range:0～1	Factory Default Value: 0

0: Linearity (Constant torque mode)

The output voltage of the inverter is in direct proportion to frequency, which is applicable to most loads as shown in the line of Fig. 6-2.

1: Square (Quadratic torque mode)

The output voltage of the inverter is in conic to frequency, which is applicable to fans, water pumps and loads so the like, as shown in the curve of Fig. 6-2.

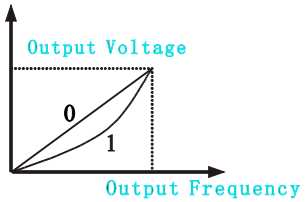


Fig. 6-2 V/F Curve

F014	Selection of acceleration/deceleration manner	Setting Range:0～1	Factory Default Value: 0

0: Linear acceleration /deceleration

The output frequency increases or decreases in accordance with constant slope.

1: S curve acceleration/deceleration

To reduce noise and vibration of the mechanical system, DO change the output frequency slowly and gradually when the acceleration/deceleration begins or ends, as shown in Fig. 6-3.

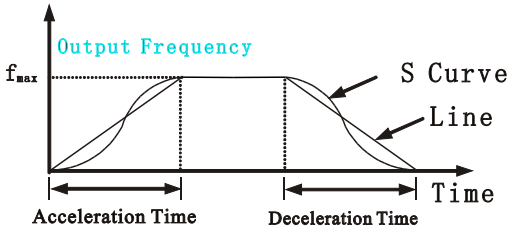


Fig. 6-3 Diagram of Acceleration/Deceleration Modes

F015	Acceleration Time 1	Setting Range:0.1～6000.0S	Factory Default Value:
F016	Deceleration Time 1	Setting Range:0.1～6000.0S	Factory Default Value:

Acceleration time refers to the period during which the output frequency of the inverter is accelerated from 0Hz to basic frequency, as shown in t1 of Fig. 6-4.

Deceleration time refers to the period during which the output frequency of the inverter is decelerated from basic frequency to 0Hz, as shown in t2 of Fig. 6-4.

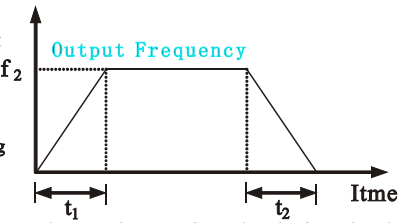


Fig. 6-4 Diagram of Acceleration/Deceleration Time

Tips

● When running at programmable multistage speed, the acceleration/deceleration time 1 participates in running as the first stage acceleration and deceleration time.

F017	Upper limit of frequency	Setting Range:F010～Maximum output frequency	Factory Default Value:50.00Hz
F018	Lower limit of frequency	Setting Range:0.00Hz～Lower limit of frequency	Factory Default Value:0.00Hz

The upper limit of frequency refers to the allowable maximum output frequency of the inverter, as shown in f3 of Fig. 6-5.

The lower limit of frequency refers to the allowable minimum output frequency of the inverter, as shown in f1 of Fig. 6-5.

During actual running, if the set frequency is smaller than the lower limit of frequency, the inverter will reduce the value of output frequency relevantly. When it reaches the lower limit of frequency, the inverter will decide its steady state output according to the running frequency set by the lower limit of frequency.

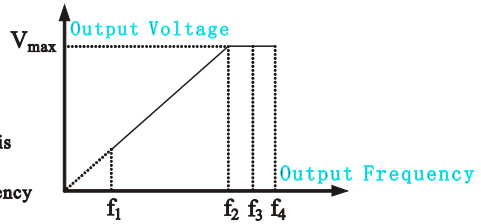


Fig. 6-5 Diagram of Upper/Lower Limit of Frequency

F019	Remain

F020	JOG operation frequency	Setting Range:0.00～50.00Hz	Factory Default Value:10.00Hz
F021	JOG acceleration time	Setting Range:0.1～3600.0S	Factory Default Value:10.0S
F022	JOG deceleration time	Setting Range:0.1～3600.0S	Factory Default Value:10.0S

F020~F022 are relevant parameters set for jogging operation, as shown in Fig. 6-6, in which t1 indicates the actual JOG acceleration time, t2 indicates the JOG time, t3 indicates the actual JOG deceleration time and f1 indicates the JOG running frequency.

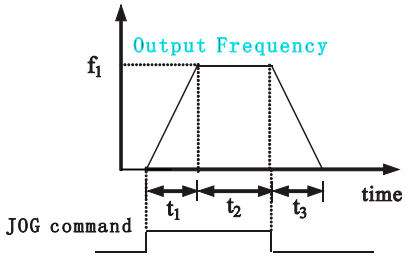


Fig. 6-6 Diagram of Acceleration/Deceleration Time

Tips

● Jogging operation begins when setting the start method F23=0 and stops when setting the stop method F029=0.

● JOG control can be performed by the operator panel, control terminals and COM ports.

● Propriety is always given to JOG frequency operation when pressing the JOG key in any running state.

F023	Selection of starting modes	Setting Range: 0～2	Factory Default Value: 0

0: Start at starting frequency

The inverter starts at a certain initial frequency, which is the starting frequency (F024).

1: Braking before starting

DC braking energy (defined in F026~F027) is given by the inverter to the loaded motor before starting the motor at the starting frequency.

2: Start in the mode of rotation speed tracking

Track the motor' s rotation speed and direction automatically. Then take the tracked speed as its starting speed and run to the set frequency according to the acceleration and deceleration time.

F024	Starting frequency	Setting Range:0.00～20.00Hz Factory Default Value:0.00Hz
F025	Starting frequency maintaining time	Setting Range:0.0～30.0S Factory Default Value:0.0S

Starting frequency is the initial frequency when the inverter starts, as shown in fs of Fig. 6-7. To ensure enough starting torque, the starting frequency should be set properly.

Starting frequency maintaining time refers to the time kept by starting frequency when the inverter starts running, as shown in t1 of Fig. 6-7.

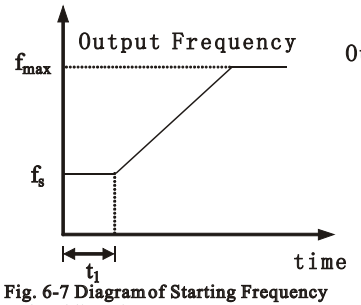


Fig. 6-7 Diagram of Starting Frequency and Holding Time

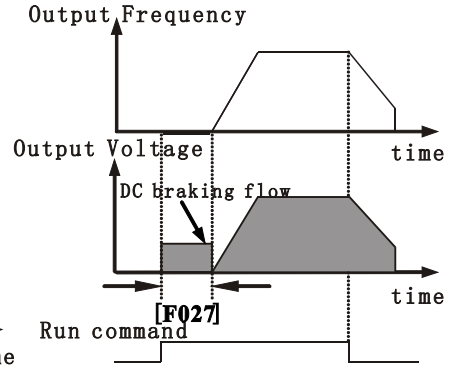


Fig. 6-8 Diagram of Starting DC Braking time

F026	Starting DC braking voltage	Setting Range:0.～20% Factory Default Value: 0%

(indicates the inverter's voltage when the motor is shutdown by DC braking)

F027	Starting-up DC braking period	Setting Range:0.0～20.0S Factory Default Value:0.0S

(indicates a specified period of time used to start the motor by DC braking)

F026 and F027 are valid only when selecting the mode "braking before starting" (F023=1), as shown in Fig. 6-8.

Tips

● DO take into the consideration of loads before generating the DC braking voltage and deciding the braking time, for over-voltage may result in current trip. As for high-speed inertia load, it is not advisable to start the machine by DC braking.

F028	FRD/REV Dead Time	Setting Range:0.0～10.0S Factory Default Value:2.0S

This indicates the time interval between FRD and REV when the inverter transfers from forward running to 0Hz then to reverse running; or from reverse running to 0Hz then to forward running, as shown in Fig. 6-9.

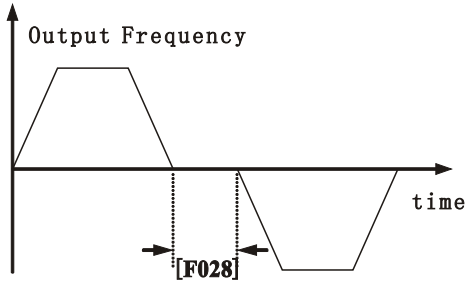


Fig. 6-9 FRD/REV Dead Time

F029	Selection of halt mode	Setting Range:0～1 Factory Default Value: 0

0: Decelerating Stop

IWhen stop command is received, the inverter will drop off output frequency in accordance with set decelerating mode and decelerating time till the frequency falls to zero and stop.

1: Free stop

Once stop command is received, the inverter will discard output immediately and the load will stop freely in accordance with the rule of mechanical inertia.

Tips

●If decelerating stop (F029=0) is selected, the inverter will discard output upon receiving of stop command. When the motor decelerates to **shutdown DC braking starting frequency** (F030) (which indicates the inverter's starting frequency when the motor is shutdown by DC braking), the inverter will stop by braking according to **shutdown DC braking voltage** (which indicates the inverter's voltage when the motor is shutdown by DC braking) set by F031 and **shutdown DC braking time** (which indicates a specified period of time used to stop the motor by DC braking) set by F032.

F030	Shutdown DC braking starting frequency	Setting Range: 0.00～20.00Hz Factory Default Value:3.00Hz
F031	Shutdown DC braking voltage	Setting Range: 0～20% Factory Default Value: 0%
F032	Shutdown DC braking time	Setting Range: 0.0～30.0S Factory Default Value:0.0S

F030 indicates the frequency at which DC braking starts working during decelerating stop of the inverter.

F031 indicates the percentage of the inverter's output voltage when the motor is shutdown by DC braking to the inverter's rated output voltage.

F032 indicates the holding time of the motor's shutdown by DC braking.

Tips

● Oversetting of the inverter's voltage when the motor is shutdown by DC braking may easily lead to inverter tripping. DO increase the voltage bit by bit.

● If the specified period of time used to stop the motor by DC braking is set to 0.0s, then no DC braking will proceed.

F033	Remain

F034	Selection of Power On display items	Setting Range: 0～13 Factory Default Value: 0

This function is used to set the display items when the inverter is just powered on.

0：Current output frequency;
1：Current set frequency;
2：Output current;
3：Output Voltage;
4：Motor rotating speed;
5：Linear speed of running;
6：Linear speed setting;
7：DC bus bar voltage;
8：Power module temperature;
9：PID target value;
10：PID feedback value;
11：Counter value;
12：Cumulative time of current running (Hours);
3：Input terminal status

F035	Remain
F036	Remain

F037	Display coefficient of linear speed	Setting Range: 0.01～100.0 Factory Default Value:1.00
F038	Display coefficient of closed-loop control	Setting Range: 0.001～10.00 Factory Default Value:1.000

F037 is used to correct the display error of linear speed. It has no effect on actual rotation speed.

F038 is used to correct the display error of PID feed or feedback flow under closed-loop control. It has no effect on closed-loop PID regulation.

F039	Selection of REV/JOG key function	Setting Range: 0～1 Factory Default Value: 1

This function is used to set the function of REV/JOG key on operator panel.

0：Select 0 to set REV function.

1：Select 1 to set JOG function.

F040	Two-wire/Three-wire operating selection	Setting Range: 0～2 Factory Default Value: 0

This function is used to select three operation modes of the inverter controlled by external control terminals.

0：Two-wire control mode 1, as shown in Table 6-3 and Fig. 6-10.

1：1: Two-wire control mode 2, as shown in Table 6-3 and Fig. 6-10.

Table 6-3 Two-wire Control Operating Instruction

Switch status		Two-wire control 1	Two-wire control 2
K2	K1	Operating instruction 1	Operating instruction 2
OFF	OFF	STOP	STOP
ON	OFF	REV	STOP
OFF	ON	FRD	FRD
ON	ON	STOP	REV

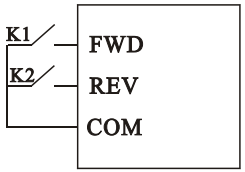


Fig. 6-10 Two-wire Control 1/2 Wiring Diagram

Note: ON indicates switch on; OFF indicates switch off.

2：Three-wire control mode

Fig. 6-11 is a three-wire control diagram, in which "SK1" represents FRD switch, "SK2" represents stop switch and "Xn" represents a three-wire operating control terminal that can be any one of the multi-function terminal X1~X6 (refer to parameter F111~F116) by selecting "13"

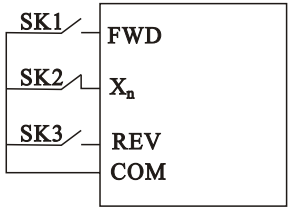


Figure 6-11 Three-wire Control Diagram

F041 Acceleration time2	Setting Range: 0.0~6000.0S	Factory Default Value:	Determined in accordance with specifications.
F042 Deceleration time2	Setting Range: 0.0~6000.0S	Factory Default Value:	Determined in accordance with specifications.

F041 and F042 refer to acceleration/deceleration time controlled by the inverter external terminals by selecting "4" of the multifunction terminal X1~X6（F111~F116）.

CAUTION

●The acceleration/deceleration time of multi-speed operation and jog operation is out of the control of external input terminals and can be set only by its own parameters.

F043	Remain
F044	Remain

F045	Selection of automatic energy-saving operation	Setting Range: 0~1	Factory Default Value: 0

When selecting automatic energy-saving operation, the inverter will automatically regulate the motor's output voltage by detecting the load current, so as to get minimum product (electric power) of voltage and current and realize energy saving.

1：Forbidden 1：Allowable

CAUTION

●This function is applicable to loads like fans, water pumps and etc.

●Automatic energy-saving operation is invalid during acceleration and deceleration.

F046	Slip compensation setting	Setting Range: 0.0~20.0%	Factory Default Value:0.0%

During actual rotation, a motor's slip is influenced by variation in load torque, which causes deviation of actual speed from the expected value. With slip compensation function, the inverter's output power can be adjusted automatically with load torque fluctuation of the motor, which can compensate off-speed arising from load fluctuation of the motor and thus improve accuracy of speed.

This parameter is the percentage of slip compensation to rated slip.

F047	AVR function selection	Setting Range: 0~1	Factory Default Value: 0

1：Forbidden

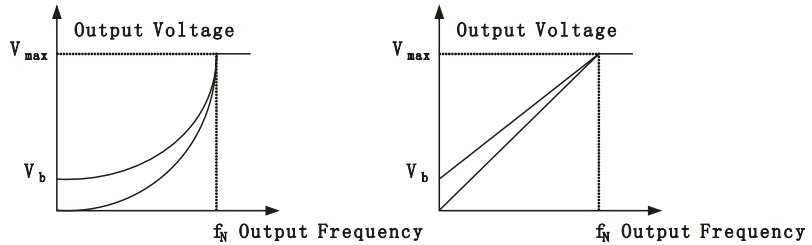
1：Allowable

AVR means automatic voltage regulation. When deviation occurs between input voltage and rated input voltage of the inverter, this function is applied to stabilize the output voltage of the inverter through auto regulation of duty factor of PWM.

This function is invalid in case the output command voltage is higher than the input power supply voltage.

F048	Torque lifting	Setting Range: 0~30%	Factory Default Value:	Determined in accordance with specifications.

Excitation voltage falls in the zone of low frequency rotation. So, it is necessary to compensate excitation current of the motor and enhance the torque in the state of low frequency rotation (improve V/F characteristic), as shown in Fig.6-12.



(1) Square descending torque characteristic

(2) Constant torque characteristic

Fig. 6-12 Torque Lifting Diagram

The "Vb" in the figure refers to manual torque lifting voltage; "Fn" refers to rated frequency of the inverter.

CAUTION

●Too high torque lifting may result in over-current protection of the inverter which may lead to failure starting of the motor. When this occurs, the set value shall be decreased properly.

WARNING

●Heat dissipation will be less effective when a motor runs at a low frequency for a long period. Oversetting of torque lifting value in this case may speed up this phenomena and lead to burnout of the motor. DO keep in mind to take a forced method to release heat from the exterior of motor or perform derating before use.

F049 Carrier frequency	Setting Range: 1.0～13KHz	Factory Default Value:	Determined in accordance with specifications.

This function is used to set the carrier frequency of the inverter's output PWM wave and should be properly regulated. The maximum value of carrier frequency is determined in accordance with power specifications. Refer to Fig. 6-13 for details on carrier frequency value, electromagnetic noise, leakage current and heating conditions.

Carrier frequency	electromagnetic noise	Leakage current	Heating value	Interference
1.0KHz ↕ 12 KHz	High ↕ Low	Low ↕ High	Low ↕ High	Low ↕ High

Fig. 6-13 Diagram of Carrier Frequency

Cautions

● Due to rich ultra harmonics existed in output current, under setting of carrier frequency will result in distortion of the waveform of output current, which may cause larger noise of motor, but less loss and lower temperature rise instead.

● Increasing the set value of carrier frequency can reduce noise of the motor, but the inverter's temperature will rise due to greater loss of power elements. If the carrier frequency value is higher than factory default setting, then the inverter shall be derated before use.

F050 Leap frequency 1	Setting Range:	Lower limit of frequency～Upper limit of frequency	Factory Default Value:0.00Hz
F051 Range of leap frequency 1	Setting Range:0.00～10.00Hz		Factory Default Value:0.00Hz
F052 Leap frequency 2	Setting Range:	Lower limit of frequency～Upper limit of frequency	Factory Default Value:0.00Hz
F053 Range of leap frequency 2	Setting Range:0.00～10.00Hz		Factory Default Value:0.00Hz

The purpose of F050~F053 setting is to avoid point of resonant frequency of mechanical load so that the second point of leap frequency of the inverter can be set.

If the leap range is set to 0, then no leap function performs at the corresponding points of leap frequency.

The inverter's output frequency can act leap operation nearby some frequency points.

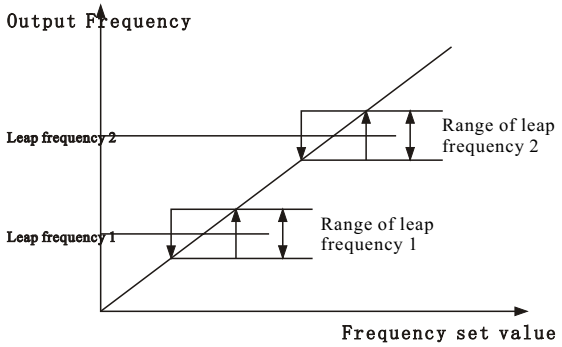


Fig. 6-14 Diagram of Leap Frequency and Range

Tips

●During accelerating and decelerating running, the inverter can not skip leap frequency.

●Do not set two leap frequency ranges overlaid or inlaid.

F054	Reference frequency of acceleration/deceleration time	Setting Range:10.0～400.0Hz	Factory Default Value:50.00Hz

This function is applied to set corresponding frequency of acceleration/deceleration time.

F055	Selection of retry mode	Setting Range:0～1	Factory Default Value: 0

(restart after instantaneous power failure)

F056	Wait time for retry	Setting Range:0.0～20.0S	Factory Default Value:1.0S

F055 0: Disable

1: Enable

This function decides whether the inverter can start running automatically or not and the wait time for auto running under different modes of control when the inverter is electrified after power failure.

Select "0" (disable), the inverter will not run automatically when it is energized after power failure.

Select "1" (enable), if starting criteria permits, the inverter will restart automatically by way of rotation speed tracing in a time set by F056 when it is energized after power failure.

During the period of waiting for restarting, it is invalid to input any operating instruction. For example, the inverter will automatically abort restarting by rotation speed tracing and restore to the status of normal stop is stop command is given during this period.

Whether the inverter will run automatically or not is co-decided by this set of parameter setting, the running status at the moment of power failure and the control command at the moment of power on.

WARNING

●If the Retry Mode which means "restart after instantaneous power failure" is enabled, an unanticipated sudden restart will happen once the equipment is energized, which may result in heavy loss of property, serious injury or death to personnel in some cases (i.e., the inverter restarts due to disconnection of input power supply undone before performing a maintenance of mechanical load). DO put a warning sign in an eye-catching place before the equipment to avoid sudden restart of the equipment.

F057	Frequency Arrival Checkout Range (FAR)	Setting Range:0.00～15.00Hz	Factory Default Value:5.00Hz

If the inverter's output frequency is within the range of positive/negative checkout range of the set frequency, the selected output terminal will output valid signal (low power level), as shown in Fig. 6-15.

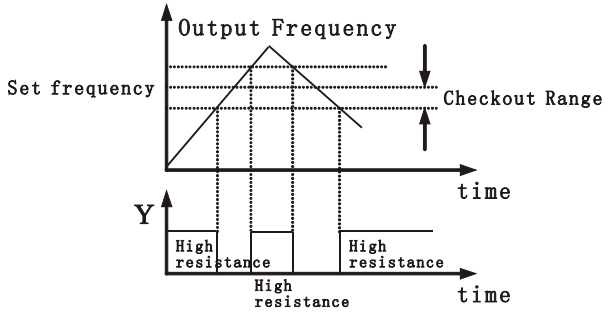


Fig. 6-15 Frequency Arrival Checkout Diagram

F058 FDT level	Setting Range: 0.00Hz~upper limit of frequency	Factory Default Value:10.00Hz
F059 FDT lagged value	Setting Range:0.00～30.00Hz	Factory Default Value:1.00Hz

This set of parameters is applied to set the frequency detection level. If the output frequency rises and exceeds the set value of FDT, then open collector signal (low power level) will be output; if the output frequency falls to the FDT removal of power level, then invalid signal (high resistance) will be output, as shown in Fig. 6-16.

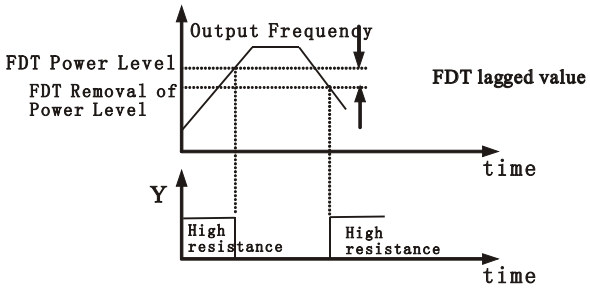


Fig. 6-16 Frequency Level Detection Diagram

F060	Overload Pre-alarm Level	Setting Range:20～110%	Factory Default Value:100%
F061	Overload Pre-alarm Action Time	Setting Range:0.0～15.0S	Factory Default Value:1.0S

Overload pre-alarm level defines the current threshold of overload pre-alarm action. Its setting range is the percentage in respect to rated current. Generally, the overload pre-alarm level should be set lower than overload protection level.

If the output current reaches the overload pre-alarm level and its durative level exceeds the set time of overload pre-alarm action, then overload pre-alarm acts, as shown in Fig. 6-17.

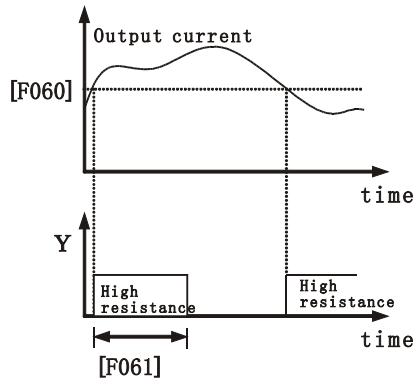


Fig. 6-17 Diagram of Overload Pre-alarm Action

F062	Remain
F063	Remain

F064	Lower limit of analog voltage (V) input	Setting Range:0.0V～F065	Factory Default Value:0.0V
F065	Upper limit of analog voltage (V) input	Setting Range:F064～10.0V	Factory Default Value:10.0V

F064 and F065 are applied to set the maximum and minimum values of external analog input voltage V, which should be set in the light of actual conditions of input signals.

F066	Lower limit of analog current (I) input	Setting Range:0.0mA～F067	Factory Default Value:4.0mA
F067	Lower limit of analog current (I) input	Setting Range:F066～20.0mA	Factory Default Value:20.0mA

F066 and F067 are applied to set the maximum and minimum values of external analog input current I, which should be set in accordance with actual situation of input signal.

F068	Bipolarity zero offset of analog input	Setting Range:0～100%	Factory Default Value:0%
F069	Corresponding frequency biasing direction of the lower limit of analog input	Setting Range:0～1	Factory Default Value:0
F070	Biasing direction of the frequency corresponding to the upper limit of analog input	Setting Range:0～1	Factory Default Value:0

This function is used to set the bipolarity control of input analog signal.

Bipolarity control indicates the inverter's output phase sequence or the motor's diversion is decided by the polarity of input analog signal. At this moment, other diversion orders are neglected by the inverter. If the analog signal is higher than the percentage of zero offset and the frequency biases positive/negative, then positive/negative phase sequence will be output and the motor forwards/reverses accordingly. If the analog signal is lower than the percentage of zero offset and the frequency biases negative/positive, then negative/positive phase sequence will be output and the motor reverses/forwards accordingly.

Bipolarity control function is valid only if the setting mode of frequency selects analog signal input (F009=3 or 4) and the frequency setting value is decided by the input analog signal at this point.

The correlation between analog input signal and set frequency with different settings is as shown in Fig. 6-18 & 6-19.

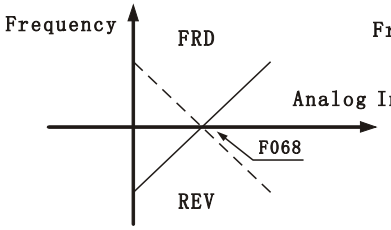


Fig. 6-18 Bipolarity Control F068=50% F069=(0) F070=0(1)

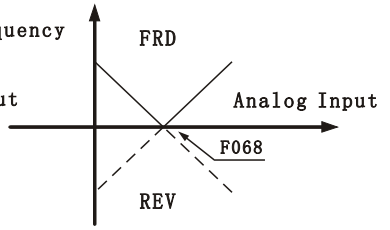


Fig.6-19 Bipolarity Control F068=50% F069=(0) F070=0(1)

If bipolarity control is selected, the parameter F068 must be greater than 0%, or it is invalid. The default setting is 0% which means invalid bipolarity control at this point. If F068 is greater than 0%, then the analog input signal within F064（F066）～F065（F067）*F068～F065（F067）will be linear with the frequency within F071～F072, and the output phase sequence of the inverter will be decided by F069 or F070.

If setting F069 and F070 to "0" and "1" separately, then the analog signal within F064（F066）～F065（F067）*F068 proceeds forward and the frequency fluctuates within F071～0.00Hz; while the analog signal within F065（F067）*F068～F065（F067）proceeds reverse and the frequency fluctuates within 0.00Hz to F072. If setting F069 and F070 to "1" and "0" separately, the above action will reverse.

If setting F069 and F070 to "0", "0" or "1", "1", then the motor proceeds forward or reverse, but the frequency still fluctuates with analog input signal and the frequency change manner remains the same as the one that proceeds forward and reverse.

F071	Corresponding frequency of minimum analog input	Setting Range: 0.00Hz~upper limit of frequency	Factory Default Value:0.00Hz
F072	Corresponding frequency of maximum analog input	Setting Range: 0.00Hz~upper limit of frequency	Factory Default Value:50.00Hz

This set of parameters is used to set the correlation between external analog input quantity and the set frequency. The relationship between set frequency and frequency setting signal after treatment of filtering and gain is shown in Fig. 6-20. These two kinds of signals can realize the characteristics of direct action and reaction separately. "fmax" and "fmin" in this figure refer to the frequency corresponding to the upper limit of input and the lower limit of input respectively.

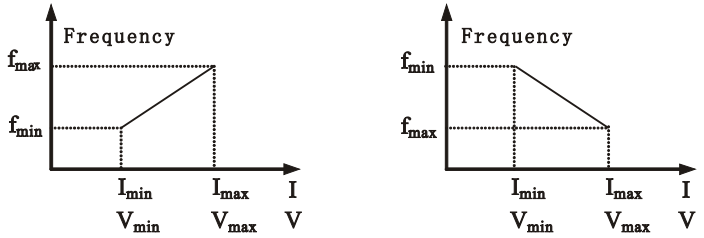


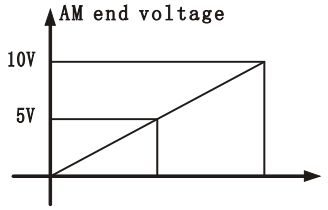
Fig. 6-20 Relation Curve of Input Quantity against Set Frequency

F073	Analog input signal delay period	Setting Range:0.1～5.0S	Factory Default Value:0.5S

This parameter is used to regulate the delay period of analog input signal.

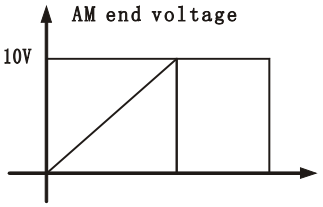
F074	Analog meter output (AM)	Setting Range:0～4	Factory Default Value: 0
F075	Analog meter output (AM) gain	Setting Range:50～200%	Factory Default Value:100%

This function is used to indicate the content of the output signal of analog output end (AM) and the value of output voltage, as shown in Fig. 6-21 and Fig. 6-22



Factory Default Value:
0Running frequency
1：Motor rotation speed
2：Output current
3：Output Voltage
4：PID feedback quantity

Fig. 6-21 Analog Output AM



Factory Default Value:
0:Running frequency
1：Motor rotation speed
2：Output current
3：Output Voltage
4：PID feedback quantity

Fig. 6-22 Analog Output AM gain=200%

F076	Analog Meter output (AM) offset	Setting Range: 0.00～3.00V	Factory Default Value:2.00V

Due to diversity of device parameters and variance in operating ambient, zero drift exists in the output voltage of analog output AM terminal. This parameter is used to compensate the influence arising from zero drift. E.g., if the zero offset of AM output is 0.20V, just set this parameter to -0.20V to make up for it. The detail compensation value should be set in the light of actual conditions.

F077	Combined selection of analog input	Setting Range:0～3	Factory Default Value: 0

When F009 selects analog input combined setting (F009=5), this function is used to select its combined mode.

0:External voltage V+External current I

1:External voltage V-External current I

2:External current I+External voltage V

3:External current I-External voltage V

F078	Remain
F079	Remain

F080	Selection of programmable multi-speed operation	Setting Range:0～4	Factory Default Value: 0

0：Non operation

1：Single cycling

The multi-speed running of the inverter stops automatically after a cycle and starts only if the run command is given again. E.g., suppose the running time at some stage is 0, then the inverter will skip to the next stage directly, as shown in Fig. 6-23.

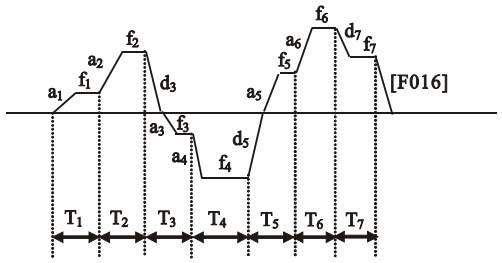


Fig. 6-23 Diagram of Programmable/Multi-speed Single-cycle Operation

f1～f7 in this figure refers to running frequency at stage 1～7 separately.

T1～T7 refers to running time at stage 1～7 separately.

a1～a6 refers to acceleration time at stage 1～7 separately.

d3, d5 and d7 refer to the deceleration time at stage 3, 5 and 7 separately.

2：Continuous cycling

This indicates the multi-speed running of the inverter recycles repeatedly and stops only if stop command is input, as shown in Fig. 6-24.

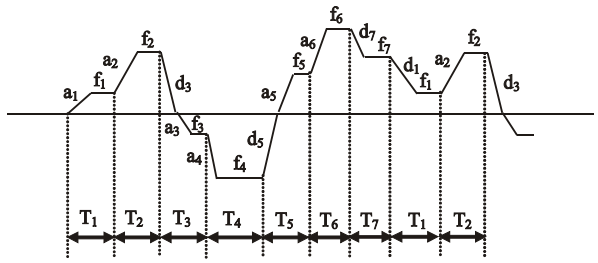


Fig. 6-24 Diagram of Programmable/Multi-speed Continuous Cycling Operation

3：Maintaining the ultimate value after singe cycling

After finishing a single cycle, the inverter will run according to the set frequency and direction of the latest multi-speed running (except stage 0), as shown in Fig. 6-25.

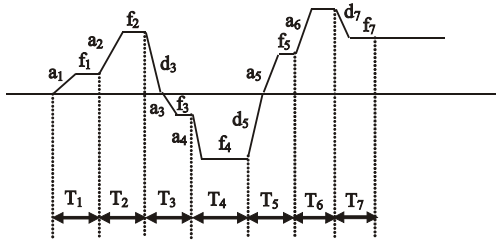


Fig. 6-25 Diagram of maintaining the ultimate value after programmable/multi-speed single Cycling Operation

4：Wobbulation Control

The output frequency of the inverter changes periodically during the preset accelerating/decelerating time. This function is especially applied to textile and chemical fiber system in which rotation speed changes due to differential diameter in the font and at the back of a bobbin, as shown in Fig. 6-26.

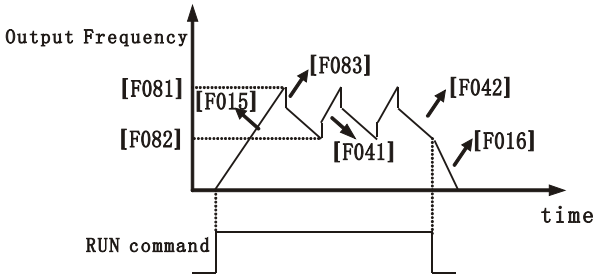


Fig. 6-26 Wobbulation Running Diagram

F081	1st-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:5.00 Hz
F082	2nd-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:10.00Hz
F083	3rd-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:20.00Hz
F084	4rd-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:30.00Hz
F085	5rd-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:40.00Hz
F086	6rd-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:45.00Hz
F087	7rd-stage speed running frequency	Setting Range: Lower limit of frequency～Upper limit of frequency	Factory Default Value:50.00Hz

F081～F087 are used to set the frequency of programmable/multistage speed running. See Fig. 6-24 for details.

F088	1st-stage speed running time	Setting Range:0.0～6000.0S	Factory Default Value:20.0S
F089	1st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F090	1st-stage speed acceleration/deceleration time	Setting Range:0.0～3600.0S	Factory Default Value:20.0S

F088～F090 are used to set the first stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F091	2st-stage speed running time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S
F092	2st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F093	2st-stage speed acceleration/deceleration time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S

F091～F093 are used to set the second stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F094	3st-stage speed running time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S
F095	3st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F096	3st-stage speed acceleration/deceleration time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S

F094～F096 are used to set the third stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F097	4st-stage speed running time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S
F098	4st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F099	4st-stage speed acceleration/deceleration time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S

F097～F099 are used to set the fourth stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F100	5st-stage speed running time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S
F101	5st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F102	5st-stage speed acceleration/deceleration time	Setting Range:0.0～3600.0S	Factory Default Value: 20.0S

F100～F102 are used to set the fifth stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F103	6st-stage speed running time	Setting Range:0.0～6000.0S	Factory Default Value: 20.0S
F104	6st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F105	6st-stage speed acceleration/deceleration time	Setting Range:0.0～6000.0S	Factory Default Value: 20.0S

F103～F105 are used to set the sixth stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F106	7st-stage speed running time	Setting Range:0.0～6000.0S	Factory Default Value: 20.0S
F107	7st-stage speed running direction	Setting Range:0～1	Factory Default Value: 0
F108	7st-stage speed acceleration/deceleration time	Setting Range:0.0～6000.0S	Factory Default Value: 20.0S

F106～F108 are used to set the sixth stage speed running time, direction, acceleration and deceleration time for programmable/multistage speed running.

F109	Remain
F110	Remain

F111	Selection of multi-function input terminal X1	Setting Range:0～20	Factory Default Value: 0
F112	Selection of multi-function input terminal X2	Setting Range:0～20	Factory Default Value: 0
F113	Selection of multi-function input terminal X3	Setting Range:0～20	Factory Default Value: 0
F114	Selection of multi-function input terminal X4	Setting Range:0～20	Factory Default Value: 0
F115	Selection of multi-function input terminal X5	Setting Range:0～20	Factory Default Value: 0
F116	Selection of multi-function input terminal X6	Setting Range:0～20	Factory Default Value: 0

The external input terminals X1～X6 are multi-function input terminals. The function of X1～X6 can be selected by setting the value of F111～F116. See detailed info on set value and function instruction below:

0：No function

1：Selection of multistage speed1；

2：Selection of multistage speed2；

3：Selection of multistage speed3；

The ON/OFF pair selected by multi-speed running at Stage 1～3 can define maximal 7 speed stages of running. Multi-speed control terminals are selected by the parameters F111～F116. The multi-speed control of external terminals can be operated together with RUN command. The multistage speed of terminals is shown in Table 6-4 below.。

Multistage speed 1	Multistage speed 2	Multistage speed 3	Selection of multistage speed	
OFF	OFF	OFF	The zero stage of multistage speed	The running frequency at this stage is set by F080.
ON	OFF	OFF	The first stage of multistage speed	The running frequency at this stage is set by F081.
OFF	ON	OFF	The second stage of multistage speed	The running frequency at this stage is set by F082.
ON	ON	OFF	The third stage of multistage speed	The running frequency at this stage is set by F083.
OFF	OFF	ON	The fourth stage of multistage speed	The running frequency at this stage is set by F084.
ON	OFF	ON	The fifth stage of multistage speed	The running frequency at this stage is set by F085.
OFF	ON	ON	The sixth stage of multistage speed	The running frequency at this stage is set by F086.
ON	ON	ON	The seventh stage of multistage speed	The running frequency at this stage is set by F087.

Note: ON indicates connection to COM terminal and OFF indicates break from COM terminal.

Fig. 6-4 Diagram of Multistage Speed Selection

4：Acceleration/Deceleration time terminal:

This is applied to external terminal to select the acceleration/deceleration time.

5：Remain

6：FRD JOG control;

7：REV JOG control;

The above two control methods refer to FRD/REV JOG running control under the mode of external terminal control.

8：Free stop control:

This refers to free stop control under the mode of external terminal control.

9：Frequency UP Command:

10：Frequency DOWN Command:

The commands in 9 and 10 are used to realize control over frequency up or down, and proceed remote control over operator panel.

11：External Failure Input:

This terminal paves the way for the inverter to keep an eye on external equipment failure by inputting failure signals of external equipment.

12：Easy PLC Pause:

Easy PLC pause is applied to give pause control over PLC process which is in operation. The equipment runs at 0 frequency if this terminal is valid and PLC running does not count the time.

13：Three-wire running control;

Refer to the parameter F040.

14：DC braking command:

DC braking command is used to apply DC braking on the motor in the course of stop, to realize emergency shut-down and accurate positioning of the motor. See the parameter F030~F032 for details.

15：External reset input:

When failure alarm occurs, this terminal is used to perform failure reset of the inverter. This function is in accord with STOP key on the operator panel.

16：Remain

17：This is used to give a control over decelerating stop under the mode of external terminal control.

18：Remain

19：Once this function is set, connect this terminal to COM terminal and the counter value will be "0".

20：Counter pulse signal input：

This is used to receive the external pulse signal which is served as the count value (This function can be set only by the multifunction terminal X6).

F117	Function selection of collector output terminal Y1	Setting Range:0～10	Factory Default Value: 0
F118	Function selection of collector output terminal Y2	Setting Range:0～10	Factory Default Value: 0

This set of parameters defines the contents of the open collector output terminals Y1 and Y2.

0：Inverter "in operation" signal：

This indicates the outlet indication signal of the inverter in running state.

1:Frequency arrival (FAR) signal：

Refer to the function declaration

2:Frequency level detection (FDT) signal:

Refer to the function declaration of F058.

3：Inverter under-voltage lockout:

When DC bus voltage is lower than the set level of under voltage, LED displays "P.oFF" and the terminal "Y" outputs indication signal.

4：External down:

When failure signal of external equipment is received through input terminal, the inverter will perform trip alarm and the terminal "Y" outlets indication signal. Under the mode of non-key operation control, press the STOP key and the terminal "Y" outputs indication signal.

5：Upper limit of output frequency arrival：

This refers to the indication signal outlet by the inverter when the running frequency reaches the upper limit of frequency.

6：Lower limit of output frequency arrival:

This refers to the indication signal outlet by the inverter when the running frequency reaches the lower limit of frequency.

7:Inverter null revolution "in service" instruction

This indicates the indication signal outlet by the inverter is still in the state of operation though the output frequency of the inverter is 0.

8：Easy PLC multistage running ends：

When a PLC multi-speed operating cycle is finished, a valid low power level pulse signal will be output at this port.

9：Inverter overload alarm signal：

When the inverter's output current exceeds overload alarm level, an effective low power signal will be output after waiting for a preset alarm delay period.

10：Count to output:

The inverter will output this signal when count value reaches the setting value if counting function is enabled.

F119	Remain
F120	Remain

F121	Selection of counting modes	Setting Range:0～2	Factory Default Value: 0

When selecting counting function enabled, then count pulse must be input by the multifunction terminal X6, and X6 must select pulse input function (refer to F111~F116 Function Selections for details), or this function will be invalid.

0：Counting function disabled.

1：Counting function enabled, up count mode.

2：Counting function enabled, down count mode.

F122 Count value	Setting Range:0～9999	Factory Default Value: 1

This function is used to set pre-value for the counter. If up count mode is selected, the counter will stop counting and perform counting to processing action when count value is equivalent to preset value. If down count mode is selected, the counter will stop counting and perform counting to processing action when count value is set to 1.

F123 Counting coefficient	Setting Range:0～9999	Factory Default Value: 1

This function is used to set unit value for each count pulse, and proceed counting on relative items.

F124 counting to processing selection	Setting Range:0～3	Factory Default Value: 0

This function is applied to counting to action selection of the counter.

0：Stop counting

1：Recounting

CAUTION

Counter Zero-clearance Operation:

●Choose one of the external multifunction terminals X1~X6, set this terminal with counter zero-clearance function and then connect this terminal to COM terminal.

F125	Remain

F126	Motor's rated frequency	Setting Range:50.00～400.0Hz	Factory Default Value:50.00Hz
F127	Motor's rated voltage	Setting Range:1～500V	Factory Default Value: Determined in accordance with specifications.
F128	Motor's rated current	Setting Range:0.1～999.0A	Factory Default Value: Determined in accordance with specifications.
F129	Motor's rated rotation speed	Setting Range:1～9999r/mm	Factory Default Value: 1450

F126~F129 are used to set parameters for the controlled motor. Do set them properly according to the data of specifications label on the motor.

F130 PID action selection	Setting Range:0～1	Factory Default Value: 0

0：PID regulation not performed.

1：PID regulation performed.

PID regulation function is described below: The built-in PID controller in the inverter detects physical quantity (feedback quantity) through the sensor of the object under control and compares this quantity to the target value of the system. If deviation exists between them, then PID regulation is used to remove deviation. It is a usual process control method used to keep the feedback quantity in accord with the target value. This system structure is as shown in Fig. 6-27.

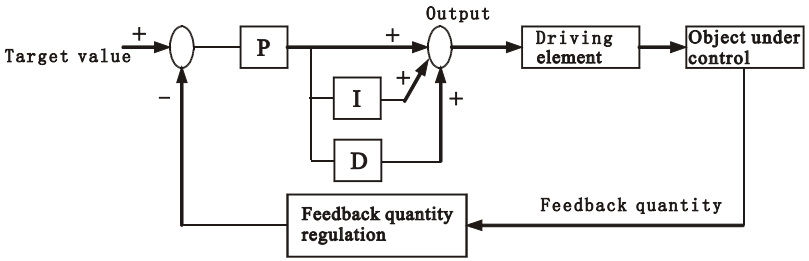


Fig. 6-27 PID Control Functional Diagram

F131 Selection of PID target value setting mode — Setting Range:0～3 Factory Default Value: 0

0：Set by the ▲/▼ key on the operator panel.
Set closed-loop feed quantity according to the target value of F132.
1：Set by external voltage signal V（0~10V）.
Set the target value according to external voltage signal V（0~10V）.
2：Set by external current signal I（0~20mA）.
Set the target value according to external current signal I（0~20mA）.
3：Set by 485 COM.
Set the target value according to 485 COM.

F132 PID target value setting — Setting Range:0.00～10.00V Factory Default Value:0.0V

When PID target value setting mode selects setting by ▲/▼ key on the operator panel（F131=0）, then this parameter is used to set the target value of PID control with "V" as its unit.

F133 Selection of feedback modes — Setting Range:0～1 Factory Default Value: 0

0：External voltage signal V（0~10V）:
Select external voltage signal V(0~10V) as closed-loop feedback quantity.
1：External current signal I（0~20mA）:
Select external current signal I(0~20mA) as closed-loop feedback quantity.

F134 PID feedback quantity gain — Setting Range:0.01～10.00 Factory Default Value:1.00

When feedback quantity is not in accord with set target value, then this parameter can be used to regulate feedback quantity signal till PID regulation meets the requirement.

F135 PID feedback polarity selection — Setting Range:0～1 Factory Default Value: 0

0：Positive
This indicates the maximum feedback quantity corresponding to the maximum input signal.
1：Negative
This indicates the maximum feedback quantity corresponding to the minimum input signal. Refer to Fig. 6-28 for details.

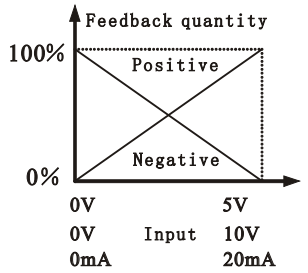


Fig. 6-28 Diagram of Feedback Polarity Selection

F136 Proportional gain (P) — Setting Range:0.01～10.00 Factory Default Value:0.50

Proportional gain (P) decides response degree of output frequency to deviation. The greater the P value is, the quicker response is, but excessive value of P may result in oscillation and too low value of P may lead to response lagging.

F137 Integral time constant Ti — Setting Range:0.0～100.0S Factory Default Value:10.0S

Integral time constant decides the proportional relation between output frequency change speed and deviation. The function of integral is to integrate the output value in accordance with deviation to compensate deviation between feedback value and set value. Too long integral time may result in slow response to external disturbance. The shorter the constant time is, the quicker the response speed is, but too short integral time may result in oscillation

F138 Differential time constant Di — Setting Range:0.0～10.0S Factory Default Value:0.0S

The function of differential is to proportionate output frequency to deviation, and respond timely to abruptly changing deviation. The longer the differential time is, the faster decay of system oscillation arising from proportional action is, but too long differential time may result in oscillation. Vise versa, the shorter the differential time is, the less decay of oscillator is.

F139 Sampling period	Setting Range:0.01～1.00S	Factory Default Value:0.10S

Sampling period refers to the cycle in which the system conducts sampling over feedback quantity. PID regulator makes a calculation in each period of sampling and gets the output value of PID regulation. The longer the sampling period is, the slower the response is.

F140 Deviation limit	Setting Range:0.0～20.0%	Factory Default Value:0.0%

Deviation limit refers to the maximum value of deviation between feedback quantity and set quantity within allowable range of the system. When the difference (modulus) between feedback quantity and set quantity is lower than this set parameter value, PID control enabled. As shown in Fig. 6-29, proper setting of this parameter is of advantage to improve the stability of the output of system which needs to avoid frequent regulation though it has no high requirement on control precision.

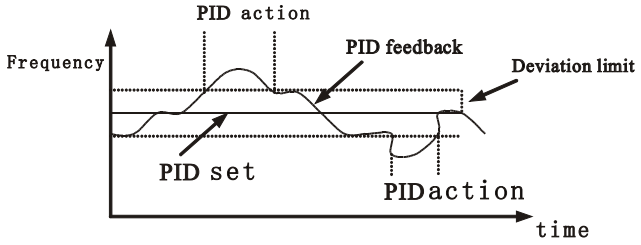


Fig. 6-29 Deviation Limit Function Diagram

F141 Sleep threshold	Setting Range:F142～100.0%	Factory Default Value:90.0%
F142 Wake-up threshold	Setting Range:0.0%～F141	Factory Default Value:0.0%
F143 Check-out time for sleep/wake-up threshold	Setting Range:0.0～6000.0S	Factory Default Value:0.0S

F141 indicates the pressure limit of water supply system in the state of sleep.

When network pressure is higher than this setting value and the frequency changing water supply system is adjusted to run at the minimum frequency, which means the actual water consumption minimizes or the water supply pressure is normal, the frequency changing water supply system will enter automatically into the state of sleep, stop and wait for wake-up.

F142 indicates the pressure limit of water supply system when it enters into working state from sleeping state.

When network pressure is lower than the setting value, which means water supply pressure decreases or water consumption increases, the frequency changing water supply system will automatically shift to the working state from sleeping state.

If water supply system conforms to the conditions for both sleep and wake-up, then the wait time for sleep or wake-up will be set by F143.

F144 Remain

F145 Selection of overload and overheat protection	Setting Range:0～1	Factory Default Value: 0

0：Free stop

When the motor or inverter overloads, the inverter will stop its output and the motor will shutdown freely.

1：Current-limiting running

When the motor or inverter overloads, the inverter will decrease output frequency to reduce load current, output alerting signal at the same time and the alarm indicator on the operator panel will turn on.

F146 Selection of input open-phase protection	Setting Range:0～1	Factory Default Value: 1

1：Forbidden

Input open-phase protection disabled.

1：Allowable

Input open-phase protection enabled.

WARNING

●The function of input open-phase protection shall be selected cautiously after the failure cause is confirmed. Otherwise, there is the possibility of damage to the inverter, loss of property, injury or even death to personnel.

F147	Selection of over-voltage stall prevention function	Setting Range:0～1	Factory Default Value: 1

1：Forbidden

1：Allowable

During decelerated service of the inverter, the motor's rotation speed may be higher than the inverter's output frequency due to the influence of load inertia. At this time, the motor feedbacks energy to the inverter, which results in rise of the inverter's DC bus voltage. During deceleration, when DC bus voltage exceeds certain power level, the over-voltage stall prevention function will be enabled, which can automatically adjust the inverter's deceleration rate to avoid over-voltage tripping.

F148	Motor thermal relay protection coefficient	Setting Range:30～110%	Factory Default Value:100%

To perform effective overload protection of load motors with different specifications, it is necessary to set proper overload protection coefficient for each type of motor and restrict the maximum current value within the allowable output range of the inverter, as shown in Fig. 6-30.

The overload protection coefficient value of a motor is the percentage of rated current value of the load motor to rated output current value of the inverter.

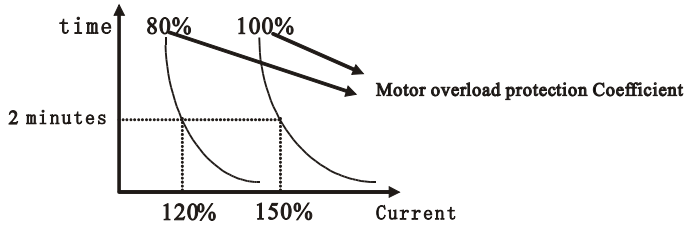


Fig. 6-30 Motor Overload Protection Curve

F149	Selection of automatic current-limiting function	Setting Range:0～1	Factory Default Value: 1

1：Forbidden

1：Allowable

The function of auto current-limiting is always valid in the state of acceleration or deceleration. If this function parameter is set to □1□, then auto current-limiting function also acts under the condition of constant speed, and the motor will be protected through input current regulation of the inverter.

F150	Over-current stall prevention level during acceleration	Setting Range:40～200%	Factory Default Value:150%
F151	Over-current stall prevention level during constant speed	Setting Range:40～200%	Factory Default Value:150%

This parameter defines current threshold of the inverter in the process of accelerated or constant speed running, that is, stall power level, whose setting value is in respect to the percentage of rated current of the inverter. During accelerated or constant speed running, once the inverter's output current exceeds over-current stall power level, the inverter will regulate its acceleration time immediately and maintain the current at this level automatically to protect the motor, as shown in Fig. 6-31.

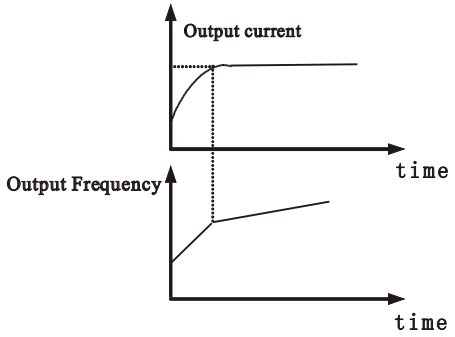


Fig. 6-31 Diagram of Automatic Current-limiting Operation

F152	Failure self-resetting times	Setting Range:0～3	Factory Default Value: 0
F153	Failure self-resetting interval	Setting Range:1～30S	Factory Default Value: 5S

The function of failure self-resetting indicates the failure arising from load fluctuation or other causes can reset automatically in accordance with set times and interval. During the process of self-resetting, the inverter will restore operation by way of rotation speed tracing and restarting. When the self-resetting times is set to "0", this indicates self reset is disabled and failure protection should be done immediately. This function is invalid for failure protection caused by overload or over heat.

WARNING

●DO take into consideration of the starting characteristic of mechanical equipment cautiously before using this function. DO NOT apply this function in case starting with load failed.

F154 Remain

F155 COM local address Setting Range:0～30 Factory Default Value: 1

This parameter is used to identify the local inverter's address which is unique when an inverter communicates with other inverters or upper machines through COM port.

If this parameter is set to "0", the local inverter under linking control will act as the main station, which decides the operation of other inverters connected to it.

If this parameter is not set to "0", the local inverter will act as a secondary receiving commands and data from an upper machine or another inverter acting as the role of main station. The inverter receives only commands and data from the upper machine or the main station in accord with marked address.

F156 COM data format Setting Range:0～2 Factory Default Value: 0

The parameter defines data format adopted in COM protocol, and normal communication goes on only if the format is in accord with the protocol.

0: No parity

1: Even parity

2: Odd parity

All the data formats are set to 1-bit starting location, 8-bit data location and 1-bit stop location.

F157COM baud rate selection Setting Range:0～5 Factory Default Value: 3

This parameter is used to specify the baud rate of RS485/232 communication, and the same baud rate shall be set to all parties involved in communication.

0: 1200BPS; 1: 2400BPS; 2: 4800BPS; 3: 9600BPS;

4: 19200BPS; 4: 38400BPS。

F158COM linking ratio Setting Range:0.01～10.00 Factory Default Value:1.00

If local inverter is set to be controlled by master inverter and the setting frequency of local machine is given by the master inverter, then this parameter is used to set weight coefficient of frequency instruction received by the local inverter which acts as a secondary through RS485/232 port. The actual setting frequency of local inverter is equivalent to the product of local parameter value and the frequency setting instruction value received through RS485/232 port.

F159 Parameter write-protect Setting Range:0～2 Factory Default Value: 0

This is used to set modification authority for parameters. See the detail below:

0: This indicates all the parameters are permitted to be overwritten, but some can not be overwritten when the equipment is in operation.

1: All the parameters are prohibited to be overwritten except numeric setting frequency and this parameter.

2: All the parameters are prohibited to be overwritten except this parameter.

F160 Remain

F161 Run time(S)

F162 Run time(H)

Running time "S" stands for second(s) and "H" stands for hour(s). The running time can be reviewed only and cannot be modified.

F163 Frequency power failure memory Setting Range:0～1 Factory Default Value: 1

0: No memory 1: Keep memory

This function indicates whether the running frequency regulated randomly keeps and stores memory or not after power failure.

F164 Ventilator fan control Setting Range:0～1 Factory Default Value: 1

This function can realize control over built-in cooling fan of the inverter.

0: The fan runs continuously (independent of whether the inverter is power-on or power-off).

1: Fan-controlled running. (When the inverter starts, the cooling fan works. During shutdown, the fan keeps a watch on the state of inverter and decides to start or stop the fan in accordance with temperature.)

F165 PWM adaptive control Setting Range:0～1 Factory Default Value: 1

This function is used to control over the inverter's carrier frequency (below 10.00Hz) whether it can change automatically or not with variation of output frequency ranging from 1.0KHz to the set carrier frequency

0: Invalid 1: Valid

F166 Remain

Chapter 7 Common Problems, Anomalies and Troubleshooting

7.1 Diagnostic Trouble Codes and Troubleshooting

Table 7-1 Common Error Codes and Solutions

Error Codes	Error Name	Probable Cause(s)	Solution(s)
OC-1	Over current during acceleration	①Excessively short acceleration time; ②Excessively heavy load inertia; ③Over torque lifting or improper V/F curve; ④Power grid voltage below level; ⑤Lower inverter power; ⑥Restart the rotating motor when instantaneous power failure occurred。	①Extend acceleration time; ②Reduce load inertia; ③Reduce torque lifting value or regulate V/F curve; ④Check input power supply; ⑤Replace an inverter with larger power; ⑥Set starting mode selection F023 to rotation speed tracing.
OC-2	Over current during deceleration	①Excessively short deceleration time; ②Excessively heavy load inertia; ③Lower inverter power;	①Extend deceleration time; ②Reduce load inertia; ③Replace an inverter withhigher power level;
OC-3	Over current while at constant speed	①Abnormal input power supply; ②Load fluctuation; ③Lower inverter power;	①Check input power supply; ②Reduce load fluctuation; ③Replace an inverter withhigher power level;
OU-1	Over voltage during acceleration	①Abnormal input power supply; ②Restart the rotating motor when instantaneous power failure occurred	①Check input power supply; ②Set starting mode selection F023 to rotation speed tracing.
OU-2	Over voltage during deceleration	①Excessively short deceleration time; ②Existence of load withenergy feedback; ③Abnormal input power supply;	①Extend deceleration time adequately. ②Select suitable brake assembly. ③Check input power supply.
OU-3	Over voltage while at constant speed	①Abnormal input power supply. ②Load with energy feedback. ③Abnormal voltage detecting channel.	①Check input power supply. ②Install or reselect brakeassembly. ③Seek service.

Error Codes	Error Name	Probable Cause(s)	Solution(s)
OU-4	Over voltage while at stop	①Abnormal input power supply.	①Check input power supply.
LU	Under-voltage during running	①Input power supply below level. ②Instantaneous power failure. ③Input power failure. ④DC circuit loose contact. ⑤Loose contactor.	①Check if power supply voltage is below level. ②Reset the inverter and check input power supply. ③Check if power grid capacity is below level. Verify if power supply voltage is normal. Is there any strong surge current, open phase or short circuit? ④Check the main circuit or seek service. ⑤Check the contactor or seek service.
LP	Input end open-phase	①Open phase of powerinput end “R”, “S” or “T”.	①Check input voltage. ②Check installation wiring.
Ler	Power module error	①Phase fault or ground fault of three output phases of the inverter. ②Instantaneous over current of the inverter. ③Excess ambient temperature. ④Air channel binding or fan damaged ⑤DC accessory power supply failure ⑥Abnormal control panel.	①Check wiring. ②Improve ventilation conditions and reduce carrier frequency. ③Clear up air channelor replace the fan. ④Seek service. ⑤Seek service.
OH	Radiator overheat	①Excess ambient temperature. ②Fan damaged. ③Air channel binding.	①Lower the ambient temperature. ②Replace the fan. ③Clear up air channelor improve ventilation conditions.
OL-1	Inverter overload	①Over torque lifting or improper V/F curve. ②Excessively short acceleration time ③Overload ④Power grid voltage below level.	①Reduce torque lifting valueor regulate V/F curve. ②Extend acceleration time. ③Replace an inverter withhigher power level. ④Check power grid voltage.

Error Codes	Error Name	Probable Cause(s)	Solution(s)
OL-2	Motor overload	①Over torque lifting or improper V/F curve. ②Power grid voltage below level. ③Motor stalled or excessive load fluctuation. ④Improper setting of the motor's overload protection coefficient.	①Reduce torque lifting value or regulate V/F curve. ②Check power grid voltage. ③Check loads and motor's status. ④Set proper overload protection coefficient F148 of the motor.
EF	External equipment failure	①Close of fault input terminal of external equipment.	①Disconnect fault input terminal of external equipment and clear failure.
CE-2	Current detection error	①Damaged hall elements or circuit failure. ②DC accessory power supply failure.	①Seek service. ②Seek service.
CE-3	Panel communication failure	①Circuit failure of patchpanel and control panel. ②Loose connection of terminals.	①Seek service. ②Check and re-connect.
CE-4	RS485 COM error	①Improper setting of baudrate. ②Communication failure due to interference at serial port. ③No communication signal of the upper machine.	①Adjust baud rate. ②Check the communication cable and take anti-interference measures. ③Check if the upper machine runs normally and the communication cable is disconnected.

7.2 Anomalies and Solutions

Table 7-2 Anomalies and Solutions

Anomalies	Probable Cause(s)	Solution(s)
No display when the power is ON	①Power grid voltage below level or open phase. ②DC accessory power supply failure. ③Charging resistor damaged.	①Check power grid voltage. ②Seek service. ③Seek service.
Power trip	①Short circuit in the inverter's input side ②Exiguous air switching capacity.	①Check wiring or seek service. ②Expand air switching capacity.
Motor doesn't run	①Incorrect wiring. ②Error setting of operation mode. ③Overload or motor stalled.	①Check wiring. ②Reset the operation mode. ③Reduce loads or regulate motor's status.
Motor reverses	①Error phase sequence of motor wiring.	①Swap random two phases of the output terminals U, V and W.
Motor acceleration/ deceleration failed	①Improper setting of acceleration/deceleration time. ②Under setting of over-current stall points. ③Over-voltage stall prevention enabled. ④Improper setting of carrier frequency or oscillation occurred. ⑤Overload.	①Reset acceleration/deceleration time. ②Increase setting value for over-current stall point. ③Extend deceleration time or reduce load inertia. ④Reduce carrier frequency. ⑤Reduce load or replace an inverter with higher power level.
Motor's speed fluctuates while at constant speed	①Excessive fluctuation of loads. ②Under setting of motor's overload protection coefficient. ③Loose contact of frequency setting potentiometer.	①Reduce load fluctuation. ②Increase overload protection coefficient. ③Replace the potentiometer or seek service.

Chapter 8 Inverter Inspection and Maintenance

8.1 Inspection and Maintenance

The following influences may lead to latent failure of the inverter such as ambient temperature, humidity, dust, vibration, as well as device ageing, wear and other causes of the inverter itself during long-period operation on industrial occasions. So it is necessary to perform daily and periodic inspections and maintenance on the inverter.

8.1.1 Daily Inspection Items

Table 8-1 Daily Check List

Item Inspected	Check for…	Inspection Cycle	Inspection Method	Criteria	Measuring Instrument
Operating ambient	●Ambient temperature ●Humidity, dust, corrosive gas, oil mist and etc.	Daily	●Thermometer. ●Scent. ●Visual.	●Ambient temperature between -10 to 40℃, no-condensing ●Humidity between 20 to 90%, no dew or special odor.	●Thermometer ●Hygrometer
Inverter	●Vibration ●Heat ●Noise	Daily	● ● ●	●Stable vibration ●Normal temperature ●No abnormal noise	
Motor	●Vibration ●Heat ●Noise	Daily	● ● ●	●Stable vibration ●Normal temperature ●No abnormal noise	
Electric Parameter	●Input voltage ●Output Voltage ●Output current	Daily	●Thermometer	●Each electric parameter is within the rated value.	●Moving-iron voltmeter ●Rectifier voltmeter ●Clip-on ammeter

WARNING

●Make sure that only qualified personnel will perform maintenance, inspection and part replacement.
●Wait at least 10 minutes after turning OFF the input power supply before performing maintenance or an inspection. Otherwise, there is the danger of electric shock.
●Make sure to open the front panel only after the indicator on the control keypad turns OFF and verify the charge indicator at the right side of main loop terminal is OFF after the panel is opened.
●Do use an insulated appliance while performing check and do not operate the equipment with wet hand(s) to avoid unexpected accidents.
●Always keep the equipment clean so that dust and other foreign matter does not enter the inverter.
●Keep electronic equipment away from moisture and oil. Dust, steel filings and other foreign matter can damage the inverter, causing unexpected accidents, so do take special care.

8.1.2 Periodic Inspection Items

Table 8-2 Periodic Inspection Items

Item Inspected		Check for…	Inspection Cycle	Inspection Method	Criteria
Main circuit	Overall	●Is there any loose connector or terminal? ●Is there any device burnt?	Regular	●Visual	●No loose connector or loose terminal. ●No burnt device.
	Main power module	●Is it damaged or not?	Regular	●Visual	●No sign of damage.
	Filter capacitance	●Is there any leakage? ●Is there any inflation?	Regular	●Visual	●No leakage. ●No inflation.
	Contactor	●Is there any abnormal sound of actuation? ●Is the dust cleaned?	Regular	●Visual ●Aural	●Normal sound Clean

Item Inspected		Check for···	Inspection Cycle	Inspection Method	Criteria
Main circuit	Resistor	● Is there any big crack? ● Is the color abnormal?	Regular	● Visual	● No crack. ● Normal color.
	Fan	●Is there any abnormal noise or vibration?	Regular	●Audio ●Visual	●Normal sound and stable vibration.
	PCB	●Is the dust cleaned?	Regular	●Visual	●Neat and clean.
Control circuit	FPC strand socket	●Is it loose?	Regular	●Visual	●No loose connection.
	Overall	●Is there any special odor or discoloring? ●Is there any crack?	Regular	●Scent or audio	●No odor and discoloring ●No crack, smooth surface.
Keyboard	LED	●Is LED display normal?	Regular	●Visual	●Normal and clear.
	Connecting cable strand	●Is there any scratch? ●Is it firmly connected?	Regular	●Visual	●No scratched surface. ●No loose connection.

WARNING

●Do not remove or shake the device arbitrarily, nor pull out the connector during inspection. Otherwise, this may result in inverter failure or damage.

●Do not leave any inspection tool (i.e., a screwdriver···) in the machine after periodic check. Otherwise, there is the danger of damage to the inverter.

8. 2 Replacement of Wearing Parts

The wearing parts of inverter mainly include cooling fan and filter electrolytic capacitor. Usually, a cooling fan's service life is 20,000~30,000 hours and an electrolytic capacitor's service life is 40,000~50,000 hours. User can decide when to replace these parts according to the corresponding operation time.

1、Cooling Fan

It is advisory to replace the fan when abnormal noise or even vibration occurred to the fan due to bearing wear and fan blade aging. The standard replacement age is 2~3 years.

2、Filter Electrolytic Capacitor

The performance of filter electrolytic capacitor is subject to the pulsating current of main circuit. High ambient temperature or frequent load jump may cause damage to the filter electrolytic capacitor. Generally, every 10℃ rise in temperature may lead to reduction of the capacitor's service life by half (as shown in Fig. 8-1). If there is any electrolytic leakage or safety valve emission, just replace it at once. The standard replacement age for electrolytic capacitor is 4~5 years.

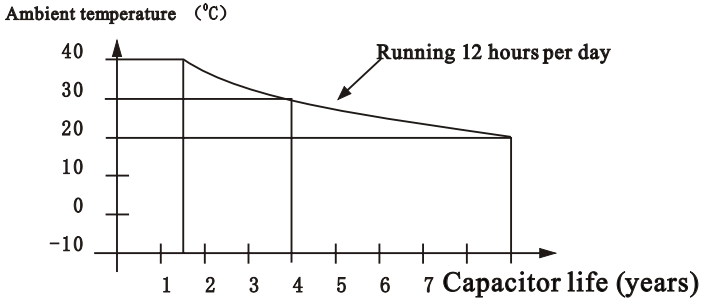


Fig. 8-1 Capacitor Life Curve

3、The above replacement duration for inverter's wearing parts is applied to the following conditions:

●Ambient Temperature: 30℃ averagely all year round.
●Load Proportion: <85%.
●Operation Time: ≤12h/day.

If used beyond the above-mention range, the life of inverter's wearing parts will minimize.

8. 3 Storage of Inverter

Please pay attention to the following points if an inverter is set aside or stored for a short/long period:

CAUTION

● DO not keep the inverter in a place with high temperature, humidity, heavy dust, metal shavings, corrosive gas and vibration, and ensure a good ventilation.

● Long-term idle of the inverter may cause decreasing in filter characteristic of the electrolytic capacitor. So it should be recharged in half a year and the recharging period should be at least 1~2 hours. DO raise the voltage gradually by using a voltage regulator to some rated value before it is recharged. At the same time, check whether the inverter' s function is normal or not, whether there is a short circuit caused by some problems. In case the above problems occur, just remove or seek service as soon as possible.

Chapter 9 Outline Dimensions & Mounting Dimensions

9.1 Inverter Outline Dimensions & Mounting Dimensions

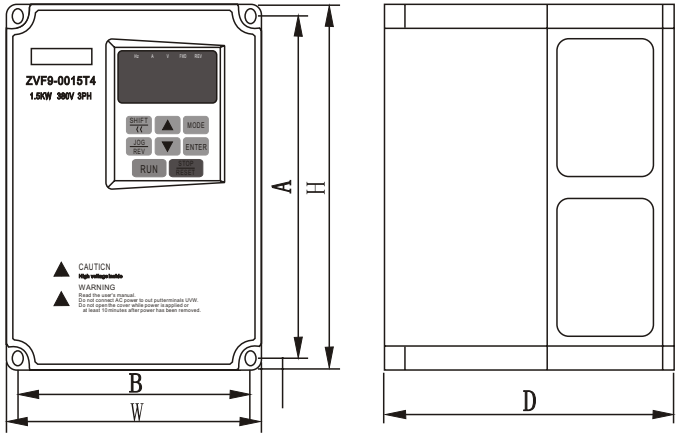


Fig. 9-1 Inverter Model A Dimensional Drawings

Inverter Models	Power (KW)	Dimension (MM)						Figure	Gross Weight (kg)
		H	W	A	B	D	d		
ZVF9-G0007T2/S2	0.75	170	125	159	113	142	Φ5	Fig.9-1	
ZVF9-G0015T2/S2	1.5								
ZVF9-G0022S2	2.2								
ZVF9-G0007T4	0.75								
ZVF9-G0015T4/P0015T4	1.5								
ZVF9-G0022T4/P0022T4	2.2								
ZVF9-P0037T4	3.7								

Inverter Models	Power (KW)	Dimension (MM)						Figure	Gross Weight (kg)
		H	W	A	B	D	d		
ZVF9-G0022T2	2.2	250	155	230	143	148	Φ5.5	Fig.9-1	3.5
ZVF9-G0037T2/S2	3.7								
ZVF9-G0037T4/P0037T4	3.7								
ZVF9-G0040T4/P0040T4	4.0								
ZVF9-G0055T4/P0055T4	5.5								
ZVF9-P0075T4	7.5								

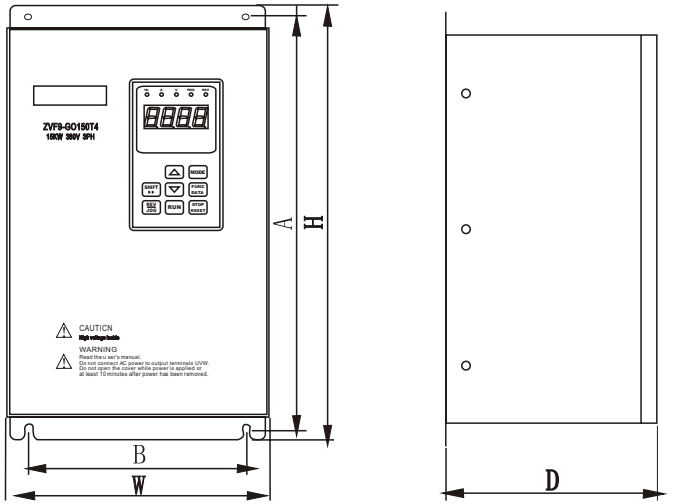


Fig. 9-2 Inverter Model B Dimensional Drawings

Inverter Models	Power (KW)	Dimension (MM)						Figure	Gross Weight (kg)
		H	W	A	B	D	d		
ZVF9-G0055T2	5.5	336	316	180	140	168	Φ10	Fig.9-2	
ZVF9-G0075T4/P0075T4	7.5								
ZVF9-P0110T4	11								
ZVF9-G0075T2	7.5	380	360	210	160	200	Φ10	Fig.9-2	
ZVF9-G0110T2/G0110T4	11								
ZVF9-G0150T4/P0150T4	15								
ZVF9-P0185T4	18.5								
ZVF9-G0150T2	15	470	450	270	206	246	Φ10	Fig.9-2	
ZVF9-G0185T2	18.5								
ZVF9-G0220T2	22								
ZVF9-G0185T4/P0185T4	18.5								
ZVF9-G0220T4/P0220T4	22								
ZVF9-G0300T4/P0300T4	30								
ZVF9-P0370T4	37								
ZVF9-G0370T4	37	630	605	360	270	290	Φ10	Fig.9-2	
ZVF9-G0450T4/P0450T4	45								
ZVF9-G0550T4/P0550T4	55								
ZVF9-P0750T4	75								
ZVF9-G0750T4	75	750	725	470	370	345	Φ12	Fig.9-2	
ZVF9-G0900T4/P0900T4	90								
ZVF9-G1100T4/P1100T4	110								
ZVF9-P1320T4	132								

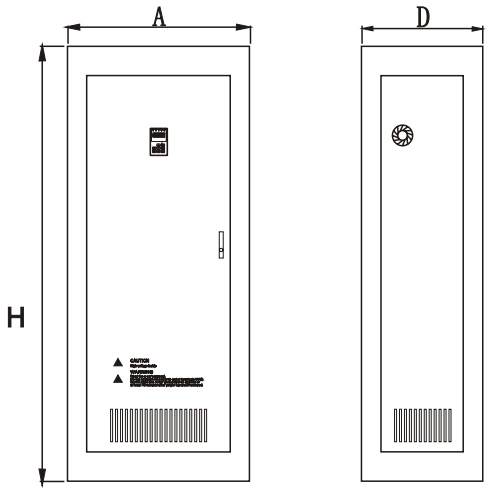


Fig. 9-3 Inverter Model B Dimensional Drawings

Inverter Models	Power (KW)	Dimension (MM)						Figure	Gross Weight (kg)
		H	W	A	B	D	d		
ZVF9-G1320T4	132	1270		574		380		Fig.9-3	
ZVF9-G1600T4/P1600T4	160								
ZVF9-G1850T4/P1850T4	185								
ZVF9-P2000T4	200								
ZVF9-G2000T4	200	1700		710		410		Fig.9-3	
ZVF9-G2200T4/P2200T4	220								
ZVF9-G2500T4/P2500T4	250								
ZVF9-G2800T4/P2800T4	280								
ZVF9-P3150T4	315								

9.2 Operator Panel Outline Dimensions & Mounting Dimensions

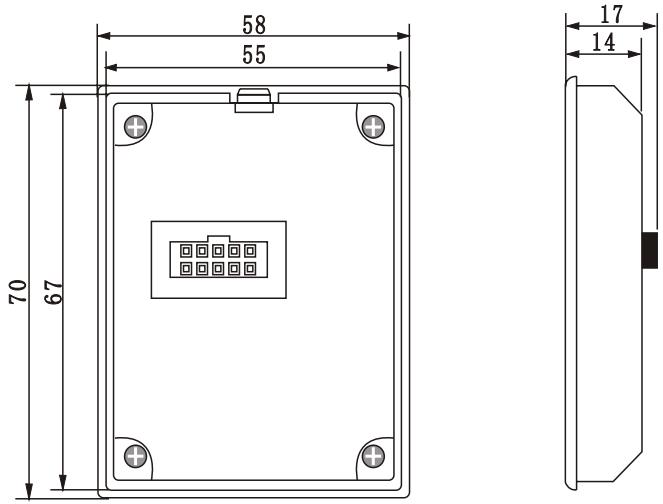


Fig. 9-4 ZR01 Operator Panel Dimensional Drawings

TIPS

●When ZR01 operator panel needs an outlet installation, an extra operator panel mounting shall be used.
●The Mounting dimension for mounting hole location shall be 60 (width)×72 (height).

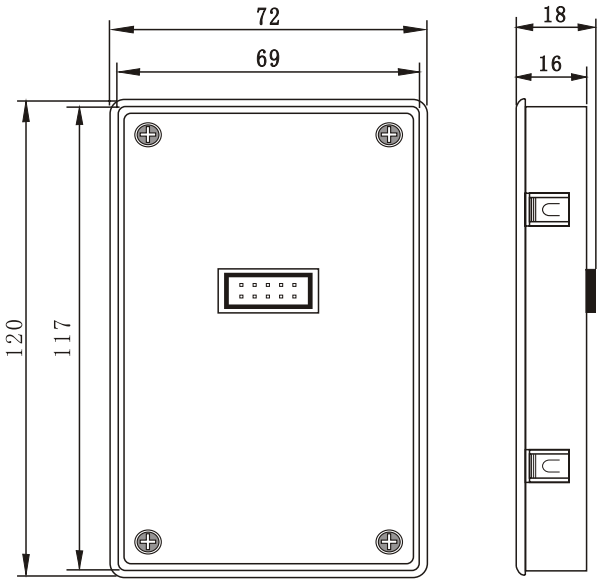


Fig. 9-5 ZR02 Operator Panel Dimensional Drawings

Tips

●When ZR02 operator panel needs an outlet installation, the mounting dimension for mounting hole location shall be 69 (width)×117 (height).

Chapter 10 Quality Warranty

10.1Inverter **Quality Warranty**

1. Warranty Period Under Normal Conditions

• We provide guarantees for repair, replacement and return of the purchase in 1 month from the date of use.

• We provide guarantees for repair and replacement in 3 months from the date of use.

• We provide guarantee for repair in 12 months from the date of use.

2. If the date of use can not be verified, then the warranty period shall be 18 months from the date of manufacture. Service exceeding the warranty period shall be charged to the purchaser. The purchaser enjoys life-long paid service whenever and wherever he uses an inverter made in our company.

3. Service in the following cases, even within the warranty period, shall be charged to the purchaser:

• Damage caused by mal-operation in violation of this manual;

• Damage caused by improper use of an inverter that is off technical standard and requirement;

• Malfunction or damage caused by fire, earthquake, flood, abnormal input voltage or other natural disasters;

• Artificial damage caused by unauthorized repair or renovation;

• Induced failure or aging of the device due to poor ambient;

• Delayed or unsatisfied payment in violation of purchase appointment;

• Unidentifiable nameplate, mark and date of manufacture;

• Malfunction or damage caused by improper transit or storage after purchase;

• Fail to give an objective description on the use of installation, wiring, operation, maintenance or else;

• Defective products should be sent to us for repair, replacement and return, which can be proceeded only after verifying the burden of liability.

4. In case there is any quality problem or accident, we merely promise to bear the above-mentioned responsibilities. If a user needs more guarantees for liabilities, please assure on the insurance company voluntarily.

Appendix 1 Optional Parts

All the optional parts can be ordered for with us if needed.

1. Brake Assembly

The brake assembly consists of two parts: braking unit and braking resistor. It is necessary to install a brake assembly on the occasion that quick stop is required though there is a heavy potential load (e.g., elevator) or inertia load.

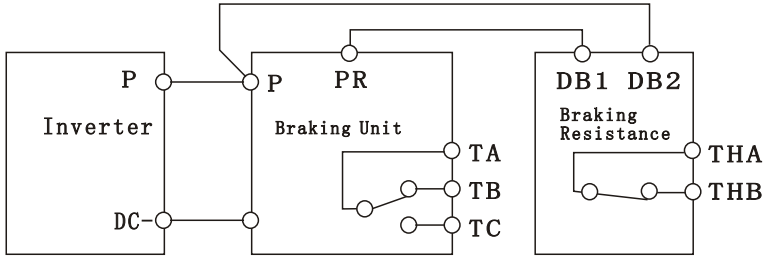


Fig. Appendix 1-1 Brake Assembly Wiring Diagram

Tips

ZVF9-G0150T4 and the machine type under this model number provide built-in braking units in the machine. If the braking torque provided by internal braking assembly is not enough, then an external braking resistor can be fitted.
When installing a brake assembly, DO take into consideration of the safety of surrounding ambient.
For detailed parameters and introduction to the function, please refer to Brake Assembly User's Manual.

Table Appendix 1-1 Recommended Brake Assembly Matching Specifications

Inverter		Braking Unit		Braking Resistance		
Voltage	Motor(kW)	Model	Quantity	Recommended resistance value	Resistor specification	Quantity
220V	0.75	Built-in		80W200Ω	80W200Ω	1
	1.5	Built-in		160W100Ω	160W100Ω	1
	2.2	Built-in		300W70Ω	300W70Ω	1
	3.7	Built-in		400W40Ω	400W40Ω	1
380V	0.75	Built-in		80W750Ω	80W750Ω	1
	1.5	Built-in		160W400Ω	160W400Ω	1
	2.2	Built-in		300W2350Ω	300W250Ω	1
	3.7	Built-in		400W150Ω	400W150Ω	1
	4.0	Built-in		400W150Ω	400W150Ω	1
	5.5	Built-in		600W100Ω	600W100Ω	1
	7.5	Built-in		800W75Ω	800W75Ω	1
	11	Built-in		1000W50Ω	1000W50Ω	1
	15	Built-in		1500W40Ω	1500W40Ω	1
	18.5	4030	1	2500W35Ω	2500W35Ω	1
	22	4030	1	3000W27.2Ω	1500W13.6Ω	2
	30	4030	1	5000W19.2Ω	2500W9.6Ω	2
	37	4045	1	6000W16Ω	1500W5Ω	4
	45	4045	1	9600W13.6Ω	1200W6.8Ω	8
	55	4030	2	12000W10Ω	1500W5Ω	8
	75	4045	2	19200W6.8Ω	1200W6.8Ω	16

2、Remote-operated adapter and extended cable

There are two selection modes for remote operation on ZVF9 inverter. If it is operated at short range（≤15m）, just extend the shielding cable directly and connect it to the operator panel. The company can provide a range of extended shielding cables with different specifications such as 1m, 1.5m, 2m, 5m and 10m. If there is any special requirement on cable length, just place an order with the company.

WARNING

DO disconnect the power when performing a remote-operated wiring.

Installation Procedure:

Proceed in accordance with the methods described in Clause 3.2.2 in this manual.

3、Serial Communication

The standard machine type of ZVF9 inverter does not provide RS232 and RS485 communication function. User shall mark out the function at the time of order. The control terminals of standard RS232 and RS485 communication interface may connect to RS232 or RS485 communication cable to realize network control or ratio interlocking control.

RS232 and RS485 serial communication protocol for ZVF9 inverter can be operated under Windows98/2000. Other monitoring software for this series, featured by friendly man-machine operation interface, can easily realize networking operation and perform monitoring and other functions of the inverter. Please contact the service center of this company or its agents if it is needed.

Appendix 2 EMC Prevention

Appendix Table 1: Inverter System EMC Prevention

The electromagnetic environment is very complicated in industrial occasions. Besides, the inverter's working principle also decides that EMC exists in the inverter itself. So it is very important to solve EMC problems effectively to ensure reliable running of the system in such a comprehensive condition. In this chapter, we give a research on EMC and provide corresponding solutions to EMC, in hope of being helpful to you to solve practical problems.

〈1〉 EMI Types and propagation mode

Type	Propagation mode
Conducted interference A	①Common-base impedance coupling ②Common source impedance coupling
Radiated interference B:	①Near field coupling ②Farness field coupling
Induction interference C	①Magnetic field coupling ②Magnetic field induction

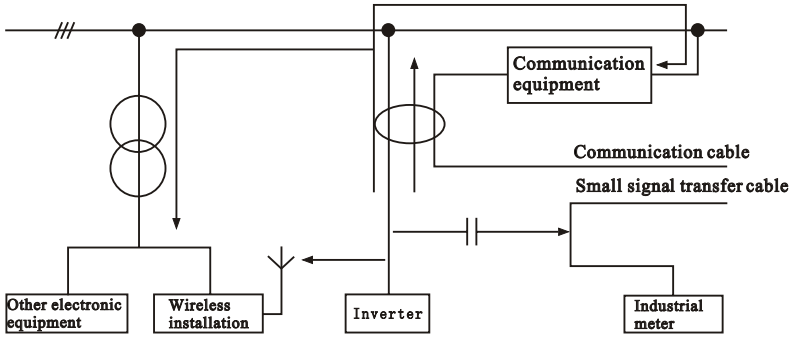
〈2〉 Inverter System EMC Solutions

Power supply input cable:

① The distortion of power grid waveform caused by superimposed higher harmonic current arisen out of nonlinear rectifier circuit to source impedance may lead to interference over other electrical equipment under the same power grid. This kind of interference is named type A② interference.

② The power current and higher harmonic current brings in alternating electromagnetic field around the circuit cable, which results in electric field coupling and magnetic flux inductive coupling to the nearer parallel cable such as the communication cable, small signal transmission cable and etc. This kind of interference is named type C① or C② interference.

③ Due to antenna effect of the cable's shielding layer, interference may be produced over external wireless installation. This kind of interference is named type B① interference.

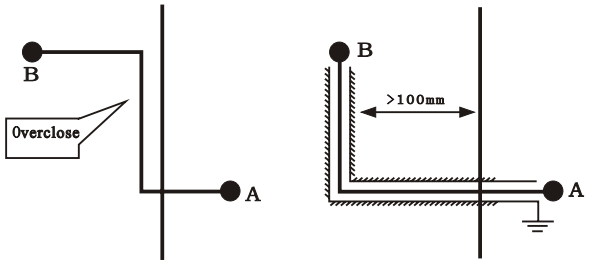


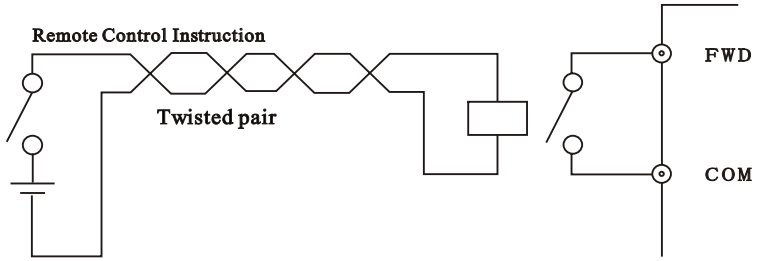
Propagation Diagram of Input Cable's Interference over External Equipment

Solutions:

① This type of interference can be suppressed by installing an EMC power supply filter or isolation transformer in the power supply input side.

②This type of interference can be suppressed through well ordered wiring or shielding. For example, the signal cable may adopt shielded wire and the shielding layer shall be firmly grounded to reduce magnetic flux inductive coupling and electric field coupling. The signal cable should be at least 100mm away from the power cable. If the signal wire and the power cable intersect, please intersect orthogonally. Generally speaking, it is not advisory to use an overlong signal wire. If the operation instruction is far from the inverter, then it is recommended to use an intermediate relay to have a control over it, as shown in the figure below.



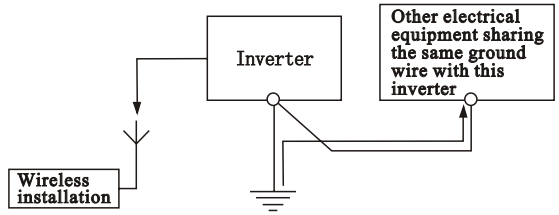


③ This type of interference can be suppressed by a good earth ground of the cable's shielding layer or by installing a wireless noise filter (i.e., a ferrite bead).

Inverter Body:

①The leakage of high frequency electromagnetic field (EMF) produced by the high speed switch of the power elements inside the inverter through the inverter's metal slit can result in radiated interference over external wireless installation. This kind of interference is named type B① interference.

②When other electrical equipment (including other inverters) share the same ground with this inverter, then type A① interference will be produced over other equipment if the ground wire impedance is high at this time.

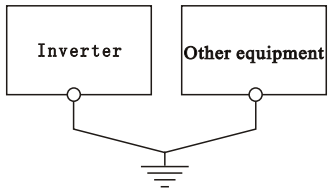


Propagation Diagram of Inverter Body's Interference over External Equipment

Solutions:

①Type B interference can be suppressed by a good earth ground of the inverter housing or by installing the inverter in a well-shielded metal cabinet. Generally, radiated interference produced by the inverter body has less influence on the external equipment.

②It is recommended that other equipment had better connect to the ground through an independent ground wire and share the same or different point beyond the earth electrode with the inverter, as shown in the figure below.

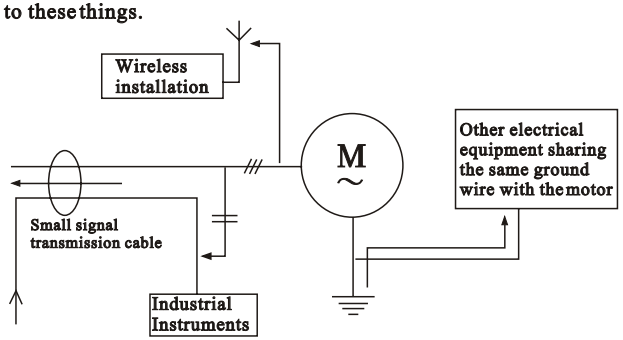


Motor Cable:

①The electromagnetic field (EMF) caused by fundamental current has weaker effect on electric field coupling and magnetic flux inductive coupling of the parallel cable. While the EMF produced by the higher harmonic current has stronger effect on electric field coupling.

② Radiated interference

③ Due to the existence of distributed capacity, there is high frequency earth leakage current and interphase leakage current in the cable, which may lead to malfunction of some leakage protection devices such as circuit breaker, relay and other equipment. DO attach importance to these things.


Wireless installation
M
Other electrical equipment sharing the same ground wire with the motor
Small signal transmission cable
Industrial Instruments

Propagation Diagram of Motor Cable's Interference over External Equipment

Solutions:

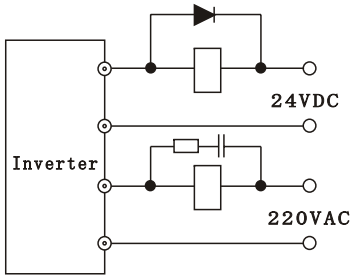
①The basic solutions are the same with the defense of electromagnetic countermeasures of a power cable.

② Install an output wireless noise filter and keep the sensitive equipment away from the motor cable; or the motor cable adopts a well grounded shielded cable and insert this cable in a metal pipe.

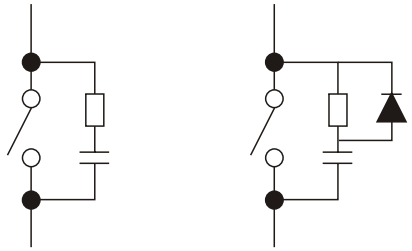
③ Use an insensitive leakage protection breaker for the inverter system only; reduce carrier frequency of the inverter; or use an AC (output) reactor to solve this kind of problems.

Relay, contactor and other electromechanical elements:

Instantaneous current and voltage surge will be caused by the close and open of the switch devices such as relay, contactor and etc, which may result in discharging radiation and conductive surge noise. This instantaneous noise must be prevented when designing the peripheral circuit of the inverter, as shown in the figure below.



As for a 24VDC controlled relay, a shunt winding continuous current diode should be inserted at both ends of the coil and pay attention to the polarity of diode. As for a 220VAC controlled contactor, an over-voltage suppressor should be mounted at both ends of the coil (i.e., RC network). Also, the protection of switch contact can not be ignored. This can be realized by forming a shunt winding RC or RCD buffered network, as shown in the figure below.



Attached Table II: Conventional Symbols Illustration

No.	Name	Figure Symbol	No.	Name	Figure Symbol
1	AC motor		2	Frequency meter	
3	Wattmeter		4	Signal light	
5	Ammeter		6	Voltmeter	
7	Main circuit terminal		8	Control loop terminal	
9	Contactor		10	Circuit breaker	
11	Thermal relay		12	Relay coil	
13	Reactor		14	Operational amplifier	
15	Diode		16	Optoelectronic coupler	
17	Switch		18	DC power supply	
19	Non-polar capacitor		20	Polar capacitor	
21	Triode (NPN type)		22	Triode (PNP type)	
23	Discharge tube		24	Piezo-resistor	
25	Resistor		26	Potentiometer	

Appendix 3 User's Parameter Amendment Record

Table Appendix 3-1 User's Parameter Amendment Record

Function Code	Function Name	Factory Default Setting	User Setting	Function Code	Function Name	Factory Default Setting	User Setting
F000	Software Versionnumber			F029	Halt mode	0	
F001	Inverter Specification Dispky			F030	Stop dc braking starting Frequency	3.00Hz	
F002	Parameter Initiating/ Removing Failure Rœord			F031	Stop DC braking voltage	0%	
F003	Remain			F032	Stop DC braking period	0.0S	
F004	Remain			F033	Remain		
F005	Remain			F034	Selection of Power On display items	0	
F006	Remain			F035	Remain		
F007	Remain			F036	Remain		
F008	Remain	50.00Hz		F037	Display coefficient of linear speed	1.0	
F009	Selection of frequency setting manner	1		F038	Display coefficient of closed-loop control	1.000	
F010	Selection of operation control mode	0		F039	Selection of REV/JOG key function	1	
F011	Selection of motor rotating direction	0		F040	Two-wire/Three-wire running control	0	
F012	Maximum output frequency	50Hz		F041	Accelerating period 2	In accordance with specifications	
F013	Selection of V/F curvemode	0		F042	Decelerating period 2		
F014	Selection of acceleration /deceleration manner	0		F043	Remain		
F015	Accelerating period 1	In accordance with specifications		F044	Remain		
F016	Decelerating period 1			F045	Selection of automatic energy-saving operation	0	
F017	Upper limit of frequency	50.00H		F046	Setting of slip compensation	0.0%	
F018	Lower limit of frequency	0.00Hz		F047	Selection of AVR function	0	
F019	Remain			F048	Torque lifting	In accordance with specifications	
F020	Jog running frequency	10.00Hz		F049	Carrier frequency		
F021	Jog accelerating period	10.0S		F050	Leap frequency 1	0.00Hz	
F022	Jog decelerating period	10.0S		F051	Range of leap frequency 1	0.00Hz	
F023	Selection of starting mode	0		F052	Leap frequency 2	0.00Hz	
F024	Starting frequency	0.00Hz		F053	Range of leap frequency 2	0.00Hz	
F025	Maintaining period of starting frequency	0.0S		F054	Reference frequency of acceleration/deceleration period	50.00	
F026	Starting DC braking voltage	0%		F055	Selection of restart after instant blackout	0	
F027	Starting DC braking period	0.0S		F056	Wait time forrestart after instant blackout	1.0S	
F028	FWD/REV dead time	2.0S		F057	Frequency arrival checkout range (FAR)	5.00Hz	

Function Code	Function Name	Factory Default Setting	User Setting	Function Code	Function Name	Factory Default Setting	User Setting
F058	Setting of FDT level	10.00H		F090	First Stage SpeedAdd-Subtract Time	20.0S	
F059	FDT lagged value	1.00H		F091	Running time at thesecond stage speed	20.0S	
F060	Overload pre-alarm level	100%		F092	Selection of running direction at the second stage speed	0	
F061	Overload pre-alarm action period	1.0S		F093	Second Stage SpeedAdd-Subtract Time	20.0S	
F062-063	Remain			F094	Third stage speed running time	20.0S	
F064	Lower limit of analog voltage input	0.0V		F095	Selection of running direction at the third stage speed	0	
F065	Upper limit of analog voltage input	10.0V		F096	Third Stage SpeedAdd-Subtract Time	20.0S	
F066	Lower limit of analog current I	4.0mA		F097	fourth stage speed running time	20.0S	
F067	Upper limit of analog current I	20.0mA		F098	Selection of running direction at the fourth stage speed	0	
F068	Bipolarity zero offset of analog input	0%		F099	Fourth Stage SpeedAdd-Subtract Time	20.0S	
F069	Biasing direction of the frequency corresponding to the lower limit ofanalog input	0		F100	Fifth stage speed running time	20.0S	
				F101	Selection of running direction at the first stage speed	0	
F070	Biasing direction of the frequency corresponding to the Upper limit of analog input	0		F102	Fifth Stage SpeedAdd-Subtract Time	20.0S	
F071	Corresponding set frequency of Min. analog input	0.00Hz		F103	Sixth stage speed running time	20.0S	
F072	Corresponding set frequency of Max. analog input	50.00H		F104	Selection of running direction at the sixth stage speed	0	
F073	Delay period of analog input signal	0.5S		F105	Sixth Stage SpeedAdd-Subtract Time	20.0S	
F074	10V Analog MeterOutput AM	1		F106	Seventh stage speed running time	20.0S	
F075	Analog Meter OutputAM Proportional Gain	100%		F107	Selection of running direction at the seventh stage speed	0	
F076	Analog Meter OutputAM Bias	0.0V		F108	Seventh Stage SpeedAdd-Subtract Time	20.0S	
F077	Analog input assembly setting	0		F109	Remain		
F078	Remain			F110	Remain		
F079	Remain			F111	Function selection of multi-function input terminal X1	0	
F080	Selection of programmable multistage speed running	0		F112	Function selection of multi-function input terminal X2	0	
F081	Output frequency at the first stage speed	5.00Hz		F113	Function selection of multi-function input terminal X3	0	
F082	Output frequency at the second stage speed	10.00Hz		F114	Function selection of multi-function input terminal X4	0	
F083	Output frequency at the third stage speed	20.00Hz		F115	Function selection of multi-function input terminal X5	0	
F084	Output frequency at the fourth stage speed	30.00Hz		F116	Function selection of multi-function input terminal X6	0	
F085	Output frequency at the fifth stage speed	40.00Hz		F117	Function selection of collector output terminal Y1	0	
F086	Output frequency at the sixth stage speed	45.00Hz		F118	Function selection of collector output terminal Y2	0	
F087	Output frequency at the seventh stage speed	50.00Hz		F119	Remain		
F088	First stage speed running time	20.0S		F120	Remain		
F089	Selection of running direction at the first stage speed	0		F121	Selection of counting modes	0	

Function Code	Function Name	Factory Default Setting	User Setting	Function Code	Function Name	Factory Default Setting	User Setting
F122	Counting value	1		F145	Overload & overheat protection method	1	
F123	Counting coefficient	1		F146	Inverter input open-phase protection	1	
F124	Count to option processing	0		F147	Over-voltage stall proof function	1	
F125	Remain			F148	Motor thermal relay protection coefficient	100%	
F126	Motor rated frequency	50.00Hz		F149	Selection of automatic current-limiting function	1	
F127	Motor rated voltage	In accordance with specifications		F150	Acceleration over-current stall proof level	150%	
F128	Motor rated current			F151	Constant speed over-current stall proof level	150%	
F129	Motor rated rotating speed	1450		F152	Failure self-resetting times	0	
F130	PID action selection	0.0S		F153	Failure self-resetting interval	5S	
F131	Selection of PID targetvalue setting mode	0.10S		F154	Remain		
F132	PID target value setting	0.0%		F155	COM address	1	
F133	PID Selection of feedback conditions	0.00		F156	COM data form	0	
F134	PID feedback flow gain	0.01		F157	COM baud rate	3	
F135	PID feedback polarity selection	0.0S		F158	Selection of COM linking ratio	1.00	
F136	Proportional gain (P)	0.5		F159	Selection of parameter protection	0	
F137	Integral time constant TI	10.0S		F160	Remain		
F138	Differential time constant DI	0.0S		F161	Actual running time (S)		
F139	Sampling period	0.1S		F162	Actual running time (H)		
F140	Deviation limit	0.0%		F163	Frequency power failure memory	0	
F141	Sleep threshold	90.0%		F164	Ventilator fancontrol	0	
F142	Revoke threshold	0.0%		F165	PWM adaptive control	0	
F143	Check-out time for sleep/revoke threshold	0.0S		F166			
F144	Remain						

Appendix 4 User's Warranty

User's Details

Name of Distributor		Date of Purchasing	
Inverter Model(s)		Identification Number	
Name of Equipment		Power Capability of the Motor	
Date of Installation		Date of Use	

Maintenance Record

Failure Cause:
Settlement:
Date of Maintenance: **Serviceman Signature:**

Failure Cause:
Settlement:
Date of Maintenance: **Serviceman Signiture:**

Tips

This copy is for the holder (user) only.

Inverter User's Warranty

User's Details

User's Work Unit		Tel	
Add.		Post Code	
Contact Person		Department	

Name of Distributor		ADD/TEL	
Date of Purchasing		Bill Number	

Inverter Model(s)		Identification Number	
Name of Equipment		Power Capability of the Motor	
Date of Installation		Date of Use	

Description of Use:

Description of Parameter Amendment:

Tips

- **User shall fill it out based on the facts with care and return it to us as soon as possible, so that we could serve you better to avoid inconvenience or loss caused by your improper installation or error use.**